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# THE GROWTH OF THE SERVICE INDUSTRIES IN THE PROVINCE OF ALBERTA, AND THEIR RELATIONSHIP TO THE SUSTENANCE AND DEVELOPMENT OF RELATED HUMAN RESOURCES

Alberta

SUBMITTED TO THE HUMAN RESOURCES RESEARCH COUNCIL

MARCH, 1971

S.E. DRUGGE

# TABLE OF CONTENTS

CHAPTER Page

I. INTRODUCTION . . . . . . . . . . . . . . . . . . . 1

II. THE TOTAL SERVICE INDUSTRY OF ALBERTA COMPARED TO FOUR OTHER PROVINCIAL INDUSTRIAL SECTORS . . . . . . . . . 12

III. THE INDIVIDUAL SERVICES OF ALBERTA COMPARED TO THE TOTAL SERVICES OF THE PROVINCE . . . . . . . . . . . 52

IV. THE INDIVIDUAL SERVICE INDUSTRIES OF CANADA . . . . . . . . . . . . . . . . . . 77

V. THE ALBERTA SERVICES IN SUMMATION . . . . . . 109

FOOTNOTES . . . . . . . . . . . . . . . . . . . . . . . 117

BIBLIOGRAPHY . . . . . . . . . . . . . . . . . . . . . 118

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# CHAPTER ONE - INTRODUCTION

There is extensive evidence to indicate that in Alberta, the service industries are accounting for the more rapid increases in employment as opposed to any other industrial sector of the economy. The service industry is defined here as being composed of personal, community, business, government and recreation components.

Because of the heightened importance assumed by these industries in the last decade, it is in order to examine the service industries for economic measures such as their rates of growth, cyclical sensitivity, structure of the labor force and change, if any, in their seasonal factors. In order to obtain some measure of comparison of their development, the service industries of Alberta will be contrasted directly to the services in other provinces, as well as Canada as a whole, and will also be compared to other secondary and tertiary industries in the province of Alberta. It is hoped that in accomplishing this, some light may be shed on the dynamic structure of the service industries, thus enabling the provincial government to adopt socioeconomic policy ensuring continued growth and employment for the future in these vital sectors of the economy.

Time Series Analysis:

Government or economic policy is undertaken on yesterday's plan and tomorrow's expectations. Thus, a forecast is necessarily based on what has happened in the past. Possibly the best means of analyzing the past so that inferences can be made for the future is by means of time series

analysis. A time series shows the variations of a known quantity, in this case employment in the services, over a period of time. The duration of time chosen here consists of the monthly employment figures from January, 1961, to December, 1968, inclusive. As in all types of economic systems, the variations in the time series are generated by the structural and stochastic processes of the economy. Thus, the observation that past behavior may indeed give an insight into future performance forms a rational basis for statistical forecasting.

In using time series data, economists are always plagued by the problem of separating cyclical from other types of fluctuations, particularly seasonal variations. It is difficult to tell on the basis of raw data whether a series is expanding or contracting, and forecasts could conceivably be made without knowing the actual state of the economy in the immediate past.

Economists have considered economic time series as being composed of cyclical, trend, seasonal and irregular factors.[1] The cycle consists of pronounced fluctuations in employment and output, with varying durations. The trend consists of longer movements, reflecting the general drift of events when cyclical fluctuations are averaged out. This factor measures the average change or growth of an economic series per unit of time. Since the trend generally has little effect on monthly fluctuations it is usually combined with the cyclical factor in short-run forecasting.

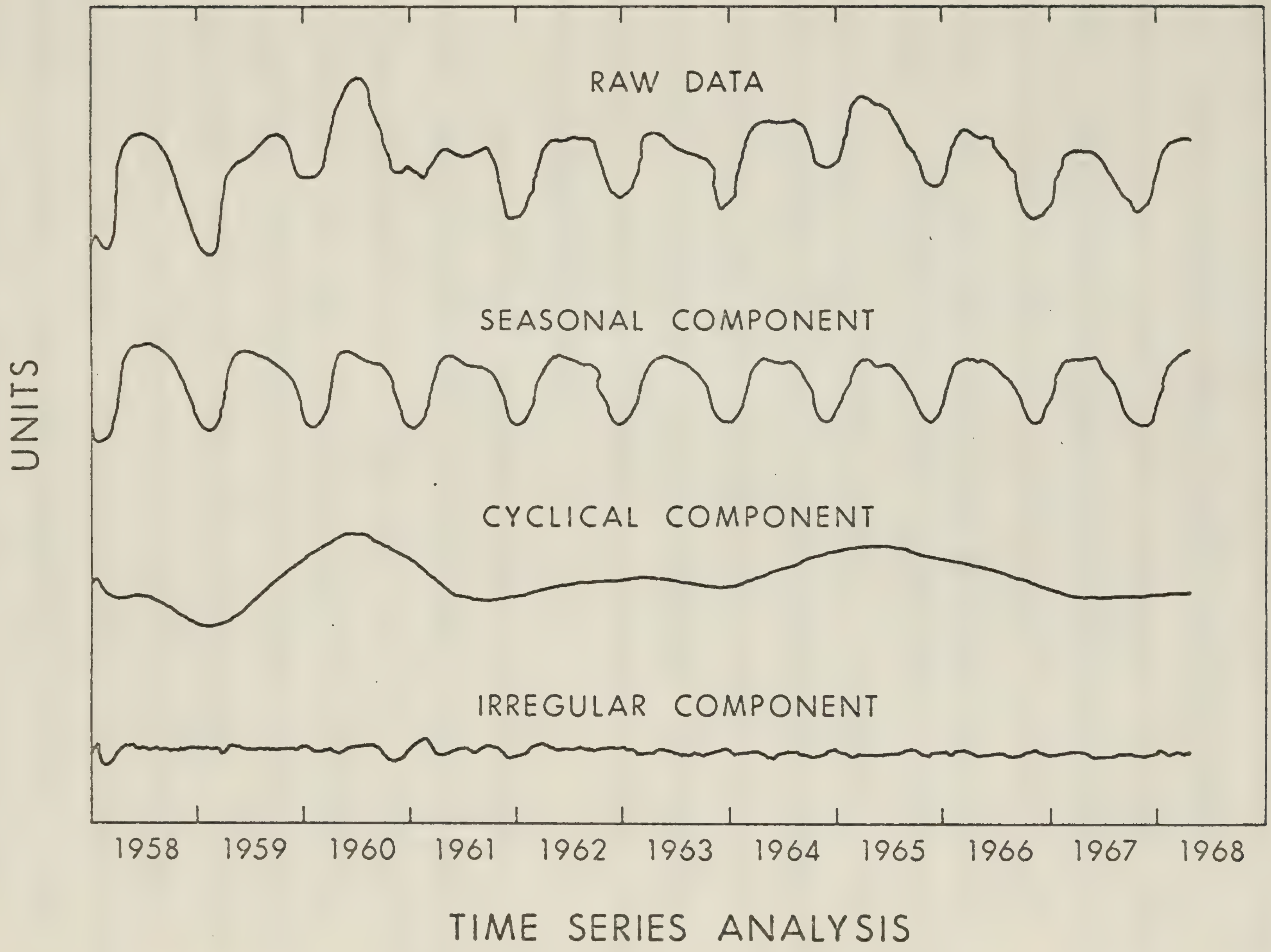
The seasonal factor consists of yearly movements that follow a regular pattern more or less every year.[2] Seasonal patterns for many types of economic time series are related to the changing seasons of the year. For example, consider freight car loadings. When crops move in the fall, loadings reach their peak, and there will be a decrease in loadings during November and December. Thus, the index number for these two months will be below the annual average, while the index for August, September and October will be above it. This seasonal factor, having been observed for a number of years, must be discounted in determining the general conditions of business. There is also a considerably large seasonal variation experienced by the retail trade, which is composed of the joint effect of buying seasons and weather-induced changes in consumer demand. This, too, must be discounted in analyzing the general state of business.

Irregular fluctuations are caused by random forces or specific and sporadic causes.[3] For example, strikes, floods, wars, politics and sampling errors can all cause disruptions in the underlying cyclical factor of most economic time series. (See Chart I).

Cyclical movements are shown more accurately and stand out more clearly in data that are seasonally adjusted, and also reveal cyclical changes earlier than unadjusted data. There are many methods of adjusting time series for seasonal variation. All are based on the idea that seasonal fluctuations can be measured and separated from the trend,

Chart I

Components of Time Series Data



cyclical and irregular fluctuations.

The method used in the following analysis is called the ratio-to-moving-average method. In this procedure an estimate is first obtained of the trend and cyclical factors by the use of a moving average which combines twelve successive monthly figures, thus eliminating seasonal fluctuations. This moving average is termed the trend-cycle curve since it contains almost all of the trend and cycle, and little or none of the seasonal and irregular movements in the data. Dividing the raw data by the moving average yields a series of seasonal-irregular ratios. An estimate of the seasonal adjustment factors is then secured by averaging the S-I ratios month by month, and assuming that the irregular factor will be cancelled out in the process. The original data is then seasonally adjusted by dividing through by the seasonal adjustment factors.

An electronic computer program for adjusting seasonal and irregular time series to show cyclical movements has been developed by Dr. Julius Shiskin.[4] It is officially designated as the "X-11 Variant of the Census Method 11 Seasonal Adjustment Program", and is put out by the Bureau of the Census of the U.S. Department of Commerce. The program also prints out the seasonal pattern of a time series, describes the irregular fluctuations and computes many summary measures. However, since the program was designed to operate on Univac equipment and the University of Alberta relies primarily on an IBM 360/67 computer, an IBM version of the

X-11 program was obtained from the Corning Glass Works of Corning, N.Y. This program proved to be fully compatible with the Shiskin program for our research purposes.

## Growth Theory - Two Models:

However, before the actual results from the time series analysis are considered, a word should be said as to how Alberta's specific economic environment came about. While analysis will show that the services have been expanding over the long run, the economic theory behind this increase must be kept in mind so that the appropriate stimuli will be activated by government socioeconomic policy to ensure a continued increase. One cannot talk in any meaningful fashion about the services without a discussion of the conceptual frame which explains their existence. This conceptual approach may be helpful in predicting to a large extent resultant future economic structure, given the present economic environment and prevailing government policy.

Therefore, two basic growth models will be examined each with a different way of accounting for the presence of the services. The models are not portrayed as mathematically sophisticated growth models, for indeed, they are not. They are not intended as the latest esoteric theory, explaining the workings of a basically capitalistic economy. However, they do give an insight into the developments over time of the economic structure as seen by two groups of theorists.

Clark and Fisher have advanced the development stages theory in their writings, which they feel explains

the resultant importance of the service industries.[5] Their growth theory has its intended application only to those areas under a capitalistic framework, which are in addition also free from severe population pressures.

Clark and Fisher originally postulate that an area is characterized by a self-sufficient economy, which nevertheless possesses quantities of undeveloped natural resources. As a transportation network is organized throughout the region, trade occurs within the area and local product specialization results. When the transportation network becomes used more and more extensively, interregional trade continues to grow and the agricultural products of the region also undergo a change. Basic crops are supplanted by cereal crops, which are later followed by the development of fruit growing, dairy farming and possibly some truck gardening.

As the population of the region continues to increase, the agriculture industry enters a phase of diminishing returns. This in turn, compels the region to start an industry capable of processing or refining its own primary resources. From these secondary industries follow the tertiary, or service, industries. They are intended not only to serve the domestic economy, but with appropriate specialization, are intended for purposes of export as well.

North, on the other hand, developed a growth model that can be summarized thusly: land and resources were exploited to be exported.[6] Given the same constraints as in the Clark and Fisher model, the question to follow logically

is what type of industries can be expected in North's resultant economic framework?

Firstly, a materials oriented industry involved in the actual processing of the extracted natural resources will develop. To complement this sector, a residentiary service industry develops, performing such functions as providing excavating machines, logging equipment, oil pipe lines and so forth. Also required for the growth area would be residentiary industries which would concern themselves solely with the task of producing goods and services for local consumption.

In North's scheme of things, it thus becomes distinctly possible that agglomerated economic activity will ensue.

Finally, North also makes some allowance for what he terms footloose industries. Such industries would be those that could locate randomly, because of minimal transport costs. For example, a firm assembling timepieces, an electronics firm, or a company engaged in research would all come under North's conception of a footloose industry.

Thus, North feels that industrialization of a region comes about if its export base is made up largely of finished commodities. In turn, the export base accounts directly for the level of income achieved by the region. The demand created upon the residentiary industries (services) within the region is also a function of the fate of the export base. Therefore, it follows that employment in the residen-

tiary industry and the export industries are highly correlated.

The Models Contrasted:

The development stages theory states primarily that as income per capita grows there is a decline in the proportion of labor employed in agriculture, followed by an increase in employment in the secondary industries, and later the tertiary industries. North, on the other hand, states emphatically that the success of a region depends solely upon the success and nature of its export industries.

Objections to the stages theory are founded on the basis that it bears little resemblance to actual historical economic development in North America and is misleading in its emphasis on industrialization. The theory appears to assume that a mature economy has a full range of industries from primary to tertiary. It supposes a quantitative law between the region's real income and the proportion of people employed in the tertiary industries. However, markets in Canada have never been at the subsistence stage, but went immediately to export as confirmed by H. A. Innis' studies of the export staples of lumber, fur, fish and wheat.[7]

North also argues that technological developments tend to more than counteract diminishing returns in a staple product. This in turn reinforces a region's dependence on staples, rather than cause a change in its export base. For example, in Canada technological changes have increased returns to agriculture tremendously since World War II.

Thus, the contention that a region must industrialize to achieve economic growth and move through three specific stages of development is a mistake. It is possible to have few people employed in primary industries, many in tertiary industries, and still be dependent on agriculture for high per capita income.

The development stages theory is a highly deterministic theory focused on the income elasticity of demand concept. It does a very good job of documenting European experience. Unfortunately, it is the insistent policy of many government and business agencies that provincial economies be moved through these stages.[8] This, in spite of the fact that major allocations of social capital have gone towards industries resulting from the export base model. It must be remembered that Alberta has not followed a stages growth pattern and still enjoys a high level of income per capita.

North claims that the non-export industries of a region are highly dependent on the export sector. However, if the export sales should decrease, it must be remembered that a region could still grow by the injection of investment into the economy, improvement in the regional terms of trade, or if residentiary industries grow enough to compensate for the decline in sales. It must also be kept in mind that in North's model, if a region is exporting it is obviously not at the subsistence level.

## Two Postulates:

Keeping these theoretical frameworks in mind, two postulates will be advanced and explored in detail in this project. The first is that the service industries in the province of Alberta are growing more rapidly than other sectors of the economy. Because of this rapid growth, they will undoubtedly absorb much of the new employment generated by an increasing labor force. It therefore becomes advisable for the government to ensure the wellbeing and indeed the growth, of these key industries, by adopting progressive and encouraging socioeconomic policy. And this in turn can only be done on a rational basis if the services are closely examined for their cyclical sensitivity, changing seasonal factors, and change, if any, in the composition of their labor force.

Following this line of thought, the second postulate is really a logical derivative of the first. If it is true that the service industries indeed are accounting for most of the new employment in the economy, which services specifically are those that are accounting for the more rapid increases? In order to obtain an answer to this question, the individual services will also be examined for their seasonal and cyclical sensitivity, and their performance in Alberta will be compared to the aggregated individual services for Canada as a whole.

# CHAPTER TWO

# THE TOTAL SERVICE INDUSTRY OF ALBERTA COMPARED TO FOUR OTHER PROVINCIAL INDUSTRIAL SECTORS

The next three chapters will be devoted to obtaining data from which conclusions may be drawn as to the direction in which specific sectors of the Alberta economy are developing. In order to obtain this information, the effects of the seasonal and irregular factors must be eliminated from the original observations, or in any case, cognizance made of their presence. Thus, the concern of the immediate chapters will be more with 'means', rather than with 'ends'.

To obtain reasonable estimates of the cyclical and seasonal sensitivity of the various provincial industries analyzed in this chapter, every effort was made to obtain compatible data in the sense that all observations would be either raw employment figures, or index numbers utilizing the same base year. With the latest possible time span chosen here for analysis, namely from January, 1961, to December, 1968, the problem of having to deal with a combination of raw employment figures and index numbers is not easily circumvented in the Dominion Bureau of Statistics publications.

With respect to this chapter of the research project, it is fortunate that all data for the five industrial sectors analyzed here was obtainable from DBS catalogue number 72 - 508. The figures published in this catalogue are presented in raw data form and not index numbers, and the observations have not been seasonally adjusted. The time span for the catalogue happily coincides with the time span of the research project, that is, monthly figures are published for the years 1961 through 1968, inclusive.

DBS catalogue number 72 - 508 is also unique in the respect that it attempts to provide complete coverage of all the establishments within an industrial sector. Unlike the DBS publication closest to its own format, DBS catalogue number 72 - 002, the latter covers only establishments employing 20 or more people, while DBS catalogue number 72 - 508 includes small, as well as large firms, and for this reason will be used whenever possible. This difference in coverage becomes rather critical when dealing with any of the service industries as many establishments are run by self-employed people with only a small number of employees. These firms would be omitted from DBS catalogue number 72 - 002, but included in DBS catalogue number 72 - 508. Why then bother with DBS catalogue number 72 - 002 at all? It will later become necessary to resort to this publication, in spite of its limitations, because it contains data which is simply unavailable elsewhere.

## SECTORS EXAMINED

The total labor force is compiled in DBS catalogue number 72 - 508 - for all of the provinces, as well as Canada as a whole. This data includes all industrial sectors with the exception of employees in agriculture, employees in public administration and defence, employees in education, those in health and welfare services, and employees engaged in working for religious groups. The sole reason for the omission of these categories is that data for these sectors was unavailable for the time span published in DBS catalogue

number 72 - 508. Hospitals were not surveyed on a regular basis in Canada until January, 1965, school boards not until May of 1965, and post-secondary education institutions not comprehensively until January, 1966.

It must also be kept in mind that DBS publication 72 - 508 also excludes proprietors, directors and firm members (even if they are actively working in the firm), pensioners, own account workers, unpaid family workers, employees working less than one day a week, employees absent without pay and persons providing services to the establishment on a contract basis.

The observations for total services in Alberta were also drawn from DBS catalogue number 72 - 508. Total services as contained within this category comprises the Standard Industrial Classification numbers from 850 to 899. This includes the categories of community, business and personal services.

The manufacturing sector comprises the SIC numbers from 100 to 399, including the manufacture of both durable and non-durable goods. SIC numbers 500 to 579 make up the establishments in the transportation, communication and utilities sector. And lastly, the trade sector in Alberta includes all firms engaged in transactions at both the wholesale and retail levels, comprising all establishments in the SIC category of 600 to 699.

## SEASONAL SENSITIVITY

The seasonal factor consists of intra-annual

fluctuations which repeat themselves more or less regularly year after year. In most economic time series, the seasonal factor will dominate the monthly movements of the more important underlying cyclical factor. What seasonal adjustment does is to provide more precise information on the timing and magnitude of seasonal changes for all months. It is much easier to follow cyclical movements in seasonally adjusted data and this adjustment becomes rather critical in facilitating the dating of peaks and troughs in economic activity.

In the absence of seasonally adjusted data, same-month-year-ago comparisons must be made which tend to be rather vague and inconclusive. With seasonally adjusted data, it is possible to analyze a time series in the current period and reveal what will happen in the economy up to one-half year earlier than with unadjusted data.[9] Seasonal adjustments enable the economist to make more accurate and prompt diagnoses of the state of the economy.

The principal reasons for Shiskin's selection of the ratio-to-moving-average method rather than some other method were that, firstly, it has been tested in the past and found satisfactory for a large number of economic series.[10] Secondly, the method permits checking and analysis at many stages in the actual process of adjustment. And thirdly, it has been universally accepted by economists.

Seasonal adjustment factors are divided into the original series in order to obtain a seasonally adjusted series. The computer program first specifies division of

the raw data or original observations by a moving average, thereby obtaining a series of seasonal-irregular ratios. An estimate of seasonal adjustment factors is then obtained by averaging the seasonal-irregular ratios month by month, resulting in a cancelling out of the irregular factor.

It should be noted that a graduated scheme is used in treating extreme values in the S-I ratios by the Shiskin program. Values of the irregular component falling outside $2.5\sigma$ are designated as extreme and receive no weight. Values between $1.5\sigma$ and $2.5\sigma$ are linearly graduated so that values of $1.5\sigma$ receive full weight, while those at $2.5\sigma$ receive no weight at all. Any value of less than $1.5\sigma$ would of course receive full weight.

The prime element i~~s~~n seasonal analysis is, of course, the seasonal adjustment factor. It is this factor which becomes the center of attention in seasonal analysis. The experience of the Dominion Bureau of Statistics has been that the seasonal adjustment factors for various Canadian economic series change over time, in other words, the adjustment factor is not a constant. In fact, it has been the conclusion of the DBS that there has been a noticeable decline during the postwar period in the amplitude of seasonal variation in Canadian economic series. The important point then becomes the question, by how much are these adjustment factors changing relative to their original values and relative to other economic time series?

Prewar publications of Canadian data by the DBS

(1929-1937) utilized fixed, not movable, seasonal adjustment factors. This was due to the fact that the procedure of seasonal adjustment was done by a laborious hand calculation procedure, and not by computer operation, due to the paucity of computers and relevant programs. Now that such programs are available, seasonal adjustment factors are quickly calculated and it is possible to observe their movement over time. Changes in seasonal factors should be expected and Canadian data cannot be adequately adjusted by using fixed seasonal factors due to the seasonal volatility inherent in the majority of Canadian industries.

Where seasonal fluctuations are large, a difference in unadjusted data for two months may be due entirely to normal seasonal fluctuations. If the data is then seasonally adjusted, the difference can be assumed to be caused largely by cyclical or irregular factors.

To firmly establish the importance of removing the seasonal factor before a time series is used as a basis for economic decisions, Table I has been compiled showing the average percentage changes without regard to sign for the irregular, cyclical, seasonal and seasonally adjusted components. These are simply obtained by averaging the month-to-month percentage changes of the various factors. However, changes are also printed for 6 and 12 month spans to show the influence of these various factors on the series over time.

For the one-month span, it is observed that the

# TABLE I

## Average Monthly Amplitudes of Time Series Components*

| | Irregular (1) | | | Cyclical (C) | | | Seasonal (S) | | | Seasonally Adjusted (CI) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spans in Months | 1 | 6 | 12 | 1 | 6 | 12 | 1 | 6 | 12 | 1 | 6 | 12 |
| Sector | | | | | | | | | | | | |
| Total Alberta Labor Force | .45 | .42 | .50 | .48 | 2.57 | 5.10 | 1.29 | 4.43 | .12 | .65 | 2.60 | 5.12 |
| Total Services | .90 | .81 | .98 | .64 | 3.81 | 7.72 | 1.10 | 1.38 | .13 | 1.06 | 3.88 | 7.80 |
| Manufacturing | 1.33 | 1.30 | 1.29 | .52 | 2.43 | 4.47 | 1.46 | 3.29 | .21 | 1.39 | 2.72 | 4.77 |
| Transportation, Communication | .76 | .74 | .83 | .32 | 1.45 | 2.25 | 1.82 | 7.38 | .17 | .85 | 1.78 | 2.36 |
| Trade | .52 | .44 | .50 | .43 | 2.46 | 4.94 | 1.12 | 2.72 | .12 | .65 | 2.48 | 4.94 |

*Percentage change without regard to sign.

seasonal factor dominates the cyclical factor for all five Alberta industrial sectors. In fact, the seasonal component is so large that it dominates the cyclical factor by up to five times in one of the series. Next in magnitude is the irregular factor, which dominates the cyclical factor in four out of five of the economic sectors, with the exception of the total Alberta labor force.

The chart clearly indicates that in the majority of economic series, both the seasonal and irregular factors dominate the monthly movements of the more meaningful, underlying cyclical factor. However, this is not the case when the time span is of longer duration, say, of 6 or 12 months. Cyclical movements tend to dominate over the longer time span, tests having shown that the cyclical amplitude accumulates uninterruptedly as the time span increases. On the other hand, the influence of the seasonal factor diminishes rapidly as the time span increases.

The behavior of the second-order magnitude factor, namely the irregular factor, falls in accordance with the results of Shiskin's experience. No matter which Alberta series is considered and regardless of the time span involved, the irregular factor remains fairly constant, whether one-month or twelve-month comparisons are made.

In the overall picture of the five sectors examined here, the series depicting the behavior of the total services and the trade sector in Alberta would appear to be the least subject to seasonal fluctuations. The most vola-

tile would appear to be the transportation, communication and utilities sector. However, it must be kept in mind that the purpose of the preceding chart was not to establish degrees of seasonal fluctuations for any one series, but rather to demonstrate the manner in which the seasonal factor dominates monthly data.

For a one month time span, the absolute percentage change in all series for the seasonal factor ranged from 1.10 to 1.82%, for the irregular factor this was .45 to 1.33%, and for the cyclical factor, .32 to .64%. It is exceedingly difficult to establish any measure of significance to attach to these monthly percentage changes, other than noting their relative magnitudes.

At this point, it becomes appropriate to discuss the seasonal factors and their behavior over time. Having established the importance of the seasonal factor in economic time series, and the desirability of removing it from the original data, a better picture of the seasonal volatility of the five sectors in question is obtained by displaying these factors graphically.

The following Table II indicates the mean and the average standard deviation of the seasonal adjustment factor from the mean. The smaller the value of the standard deviation, the more tightly the seasonal adjustment factors will be bunched around the mean. However, since this is a measure of the average value, it does not preclude the occasional value at extreme ends of the total range.

## Table II

### Final Seasonal Factors

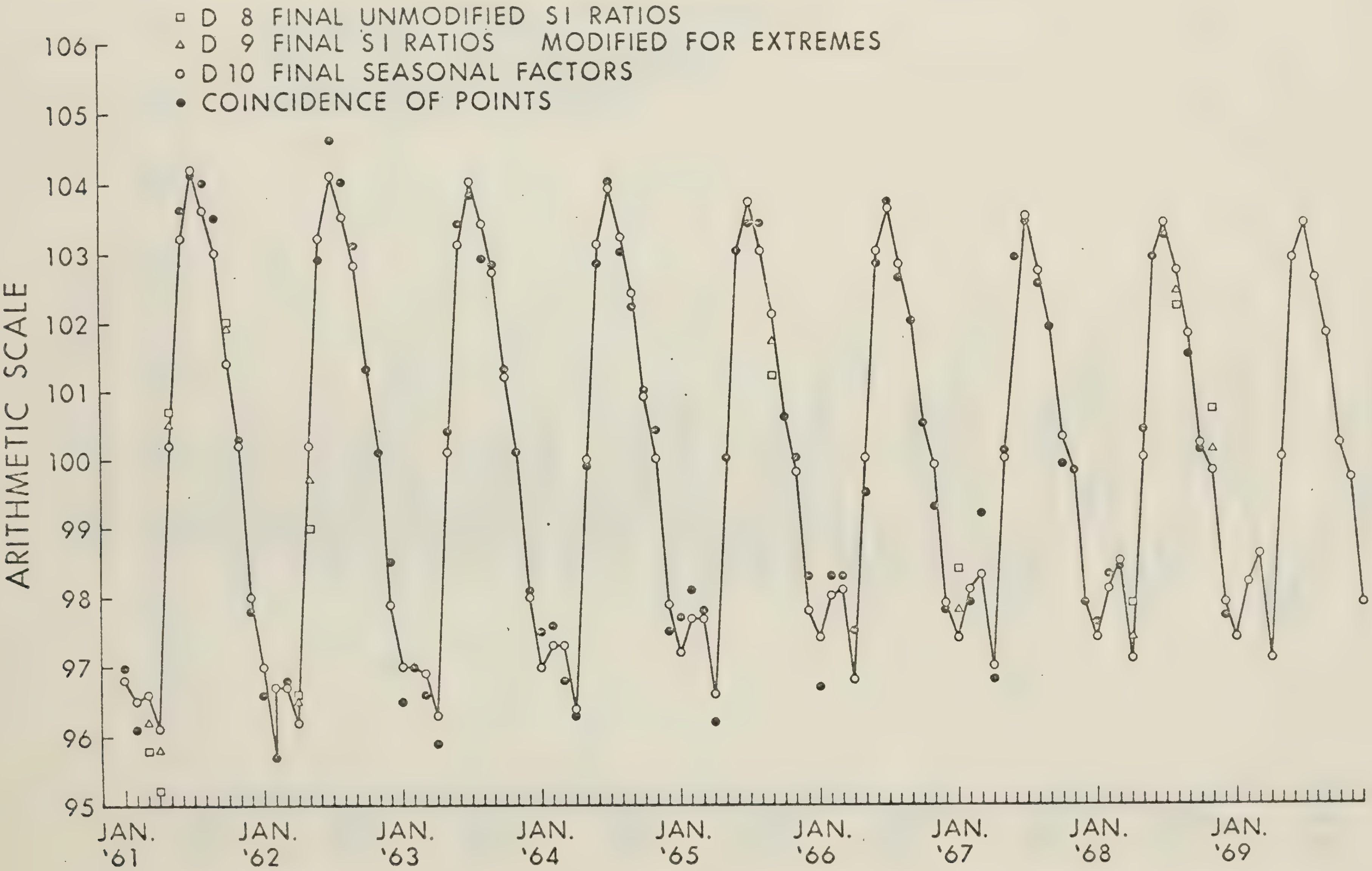
| Sector | Standard Deviation* | Mean |
|---|---|---|
| Total Alberta Labor Force | 2.6 | 100.00 |
| Total Services | 1.0 | 100.00 |
| Manufacturing | 2.0 | 100.00 |
| Transportation, Communication | 4.1 | 100.00 |
| Trade | 1.9 | 100.00 |

*Average Deviation from the Mean.

Observing the seasonal adjustment factors for the total labor force of Alberta (Chart II, and Table III, A) it becomes readily apparent that the factors are decreasing over time. The extremes of factors in the year 1961 were 96.1 to 104.2, while in 1969 they were projected at 97.1 to 103.4. Compared to the other four industrial sectors looked at in this chapter, the labor force has one of the largest ranging seasonal factors. In other words, the Alberta labor force is highly subject to seasonal conditions, which is not altogether unexpected. The seasonal factors for the winter months are smaller than those for the summer months (see D10), thus inflating the CI growth implied by the original series, i.e. inflating the size of the adjusted labor force.

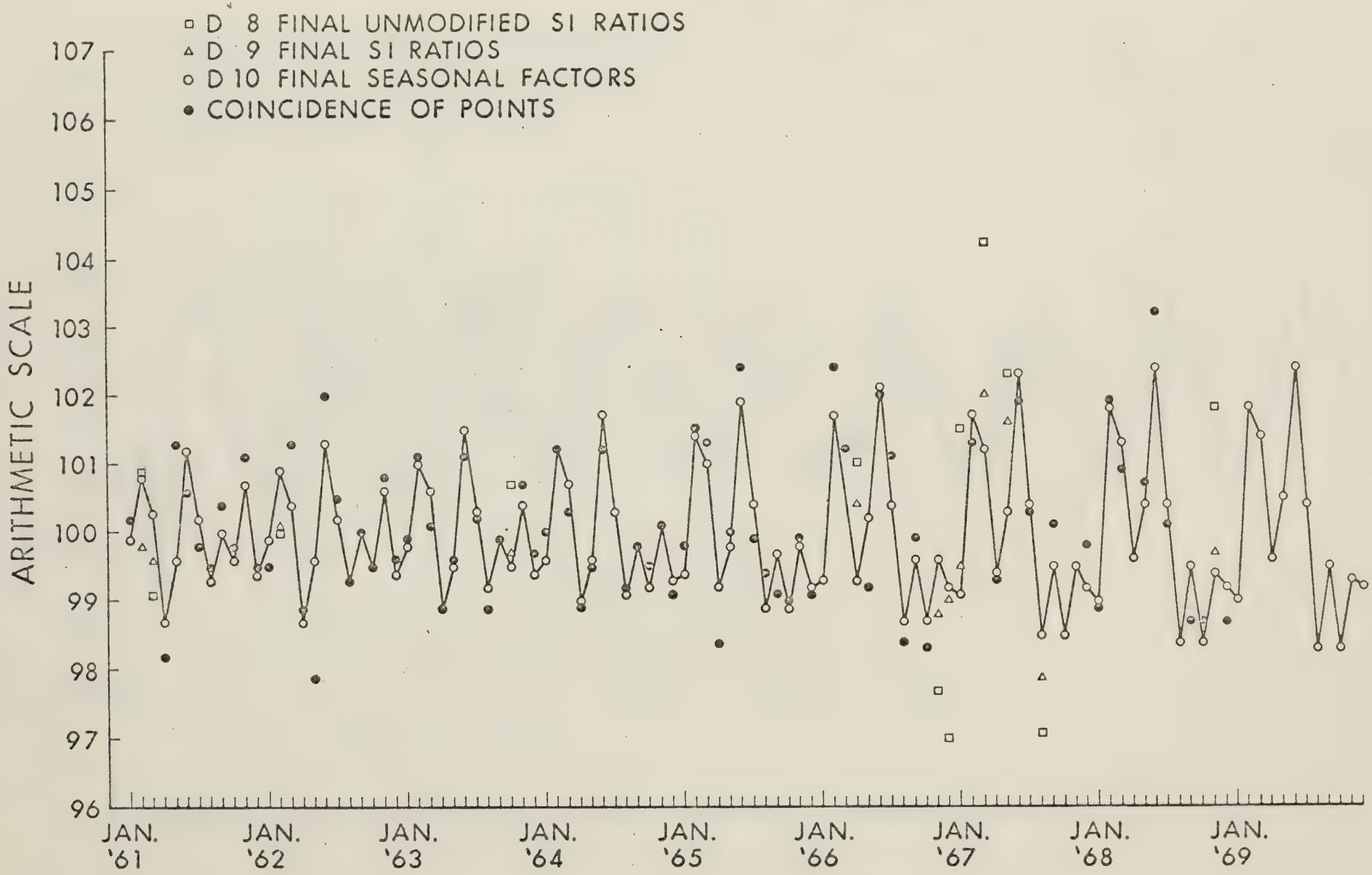
The seasonal adjustment factors for the total services present a diverging pattern over time (see Chart III and Table III, B). The range in 1961 was 98.7 to 101.2, but by 1969 this was expected to be 98.3 to 102.4 (see

Chart II



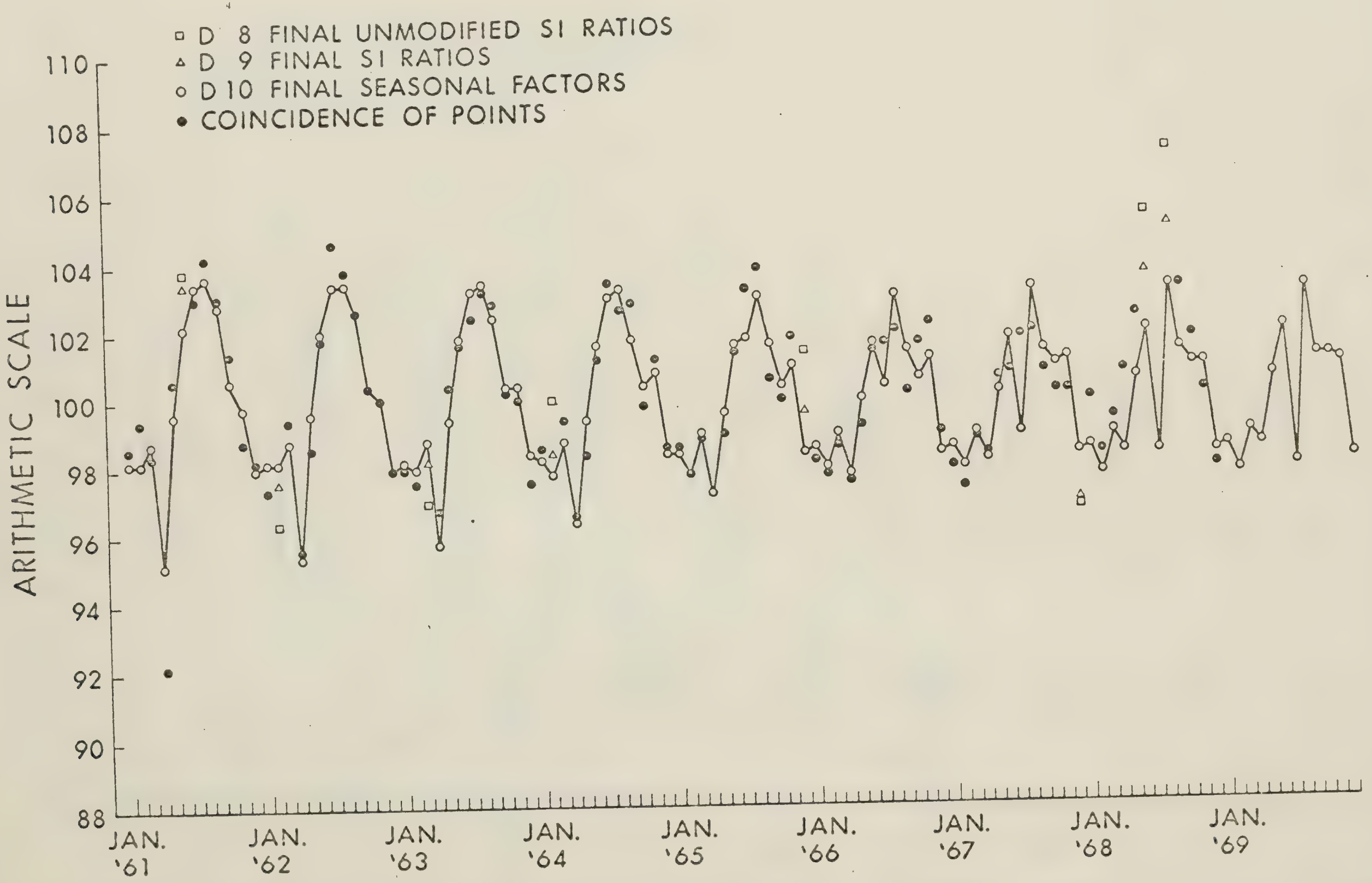
JULY 1970 TOTAL LABOR FORCE - ALBERTA DBS CAT. No. 72-508

Chart III



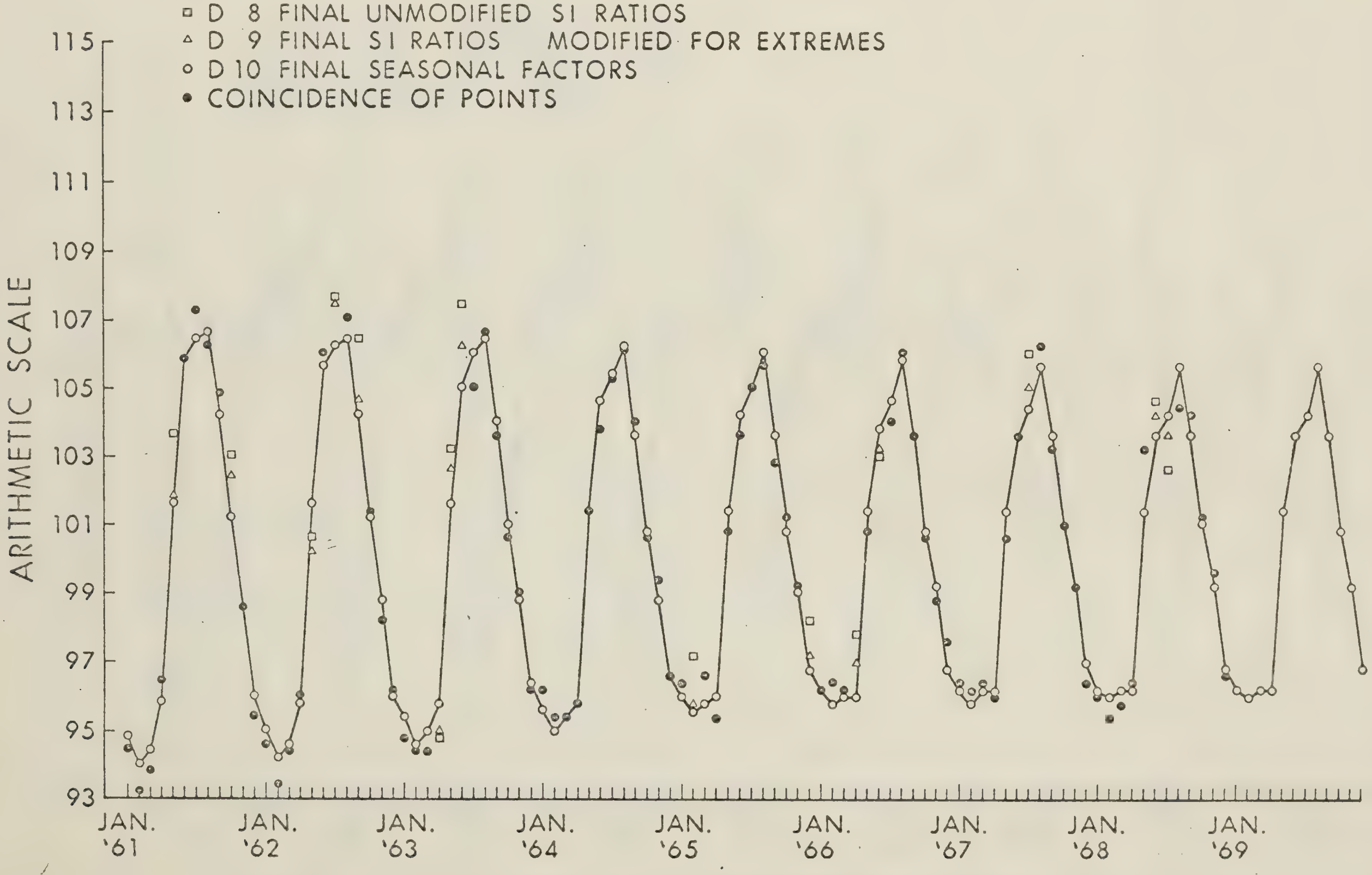
JULY 1970 TOTAL SERVICES EMPLOYEES - ALBERTA (ALL FIRMS) DBS CAT. No. 72-508

Chart IV



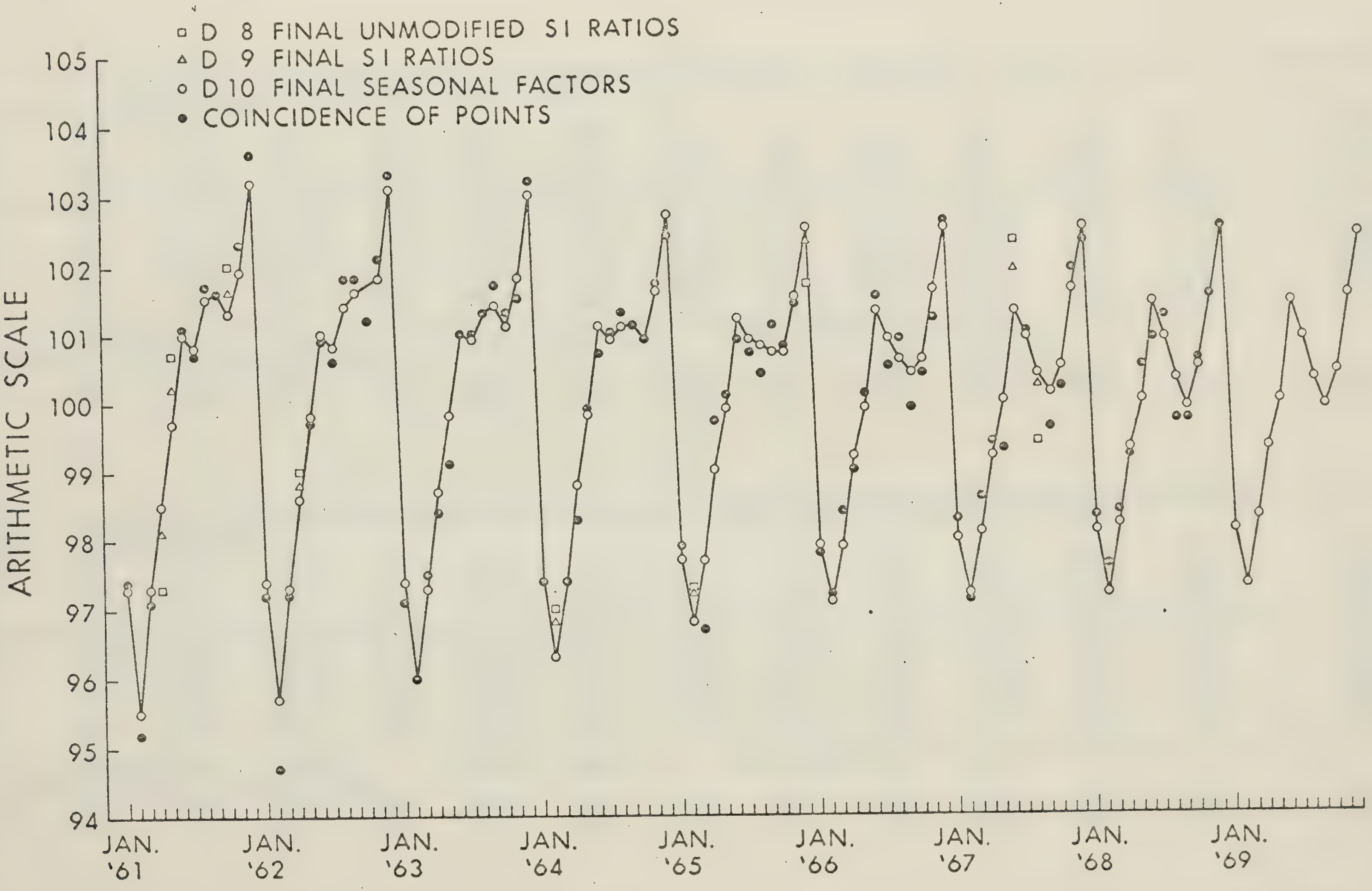
AUG. 1970 TOTAL MANUFACTURING EMPLOYEES - ALBERTA DBS CAT. No. 72-508

Chart V



AUG. 1970 TRANSP., COMMUNICATION EMPLOYEES-ALBERTA DBS CAT. No. 72-508

Chart VI



AUG. 1970 TOTAL TRADE EMPLOYEES - ALBERTA DBS CAT. No. 72-508

# Table III

## A

JULY 1970 TOTAL LABOR FORCE - ALBERTA (ALL FIRMS) DBS CAT. NO. 72-508

D10. FINAL SEASONAL FACTORS

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 96.8 | 96.5 | 96.6 | 96.1 | 100.2 | 103.2 | 104.2 | 103.6 | 103.0 | 101.4 | 100.2 | 98.0 | 100.0 |
| 1962 | 97.0 | 96.7 | 96.7 | 96.2 | 100.2 | 103.2 | 104.1 | 103.5 | 102.8 | 101.3 | 100.1 | 97.9 | 100.0 |
| 1963 | 97.0 | 97.0 | 96.9 | 96.3 | 100.1 | 103.1 | 104.0 | 103.4 | 102.7 | 101.2 | 100.1 | 98.0 | 100.0 |
| 1964 | 97.0 | 97.3 | 97.3 | 96.4 | 100.0 | 103.1 | 103.9 | 103.2 | 102.4 | 100.9 | 100.0 | 97.9 | 99.9 |
| 1965 | 97.2 | 97.7 | 97.7 | 96.6 | 100.0 | 103.0 | 103.7 | 103.0 | 102.1 | 100.6 | 99.8 | 97.8 | 99.9 |
| 1966 | 97.4 | 98.0 | 98.1 | 96.8 | 100.0 | 103.0 | 103.6 | 102.8 | 102.0 | 100.5 | 99.9 | 97.9 | 100.0 |
| 1967 | 97.4 | 98.1 | 98.3 | 97.0 | 100.0 | 102.9 | 103.5 | 102.7 | 101.9 | 100.3 | 99.8 | 97.9 | 100.0 |
| 1968 | 97.4 | 98.1 | 98.5 | 97.1 | 100.0 | 102.9 | 103.4 | 102.7 | 101.8 | 100.2 | 99.9 | 97.9 | 100.0 |

TABLE TOTAL- 9597.2 MEAN- 100.0 STD. DEVIATION- 2.6

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1969 | 97.4 | 98.2 | 98.6 | 97.1 | 100.0 | 102.9 | 103.4 | 102.6 | 101.8 | 100.2 | 99.7 | 97.9 | 100.0 |

## B

JULY 1970 TOTAL SERVICES EMPLOYEES - ALBERTA (ALL FIRMS) DBS CAT. NO. 72-508

D10. FINAL SEASONAL FACTORS

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 99.9 | 100.8 | 100.3 | 98.7 | 99.6 | 101.2 | 100.2 | 99.3 | 100.0 | 99.6 | 100.7 | 99.4 | 100.0 |
| 1962 | 99.9 | 100.9 | 100.4 | 98.7 | 99.6 | 101.3 | 100.2 | 99.3 | 100.0 | 99.5 | 100.6 | 99.4 | 100.0 |
| 1963 | 99.8 | 101.0 | 100.6 | 98.9 | 99.5 | 101.5 | 100.3 | 99.2 | 99.9 | 99.5 | 100.4 | 99.4 | 100.0 |
| 1964 | 99.6 | 101.2 | 100.7 | 99.0 | 99.6 | 101.7 | 100.3 | 99.1 | 99.8 | 99.2 | 100.1 | 99.3 | 100.0 |
| 1965 | 99.4 | 101.4 | 101.0 | 99.2 | 99.8 | 101.9 | 100.4 | 98.9 | 99.7 | 98.9 | 99.8 | 99.2 | 100.0 |
| 1966 | 99.3 | 101.7 | 101.2 | 99.3 | 100.2 | 102.1 | 100.4 | 98.7 | 99.6 | 98.7 | 99.6 | 99.2 | 100.0 |
| 1967 | 99.1 | 101.7 | 101.2 | 99.4 | 100.3 | 102.3 | 100.4 | 98.5 | 99.5 | 98.5 | 99.5 | 99.2 | 100.0 |
| 1968 | 99.0 | 101.8 | 101.3 | 99.6 | 100.4 | 102.4 | 100.4 | 98.4 | 99.5 | 98.4 | 99.4 | 99.2 | 100.0 |

TABLE TOTAL- 9598.0 MEAN- 100.0 STD. DEVIATION- 1.0

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1969 | 99.0 | 101.8 | 101.4 | 99.6 | 100.5 | 102.4 | 100.4 | 98.3 | 99.5 | 98.3 | 99.3 | 99.2 | 100.0 |

# Table IV

## A

```
              AUG 1970   TOTAL MANUFACTURING EMPLOYEES - ALBERTA          DBS CAT. NO. 72-508
D10.  FINAL SEASONAL FACTORS
  YEAR       JAN       FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC            AVGE
  1961       98.1      98.2     98.7     95.2     99.6    102.1    103.3    103.5    102.7    100.5     99.8     98.0          100.0
  1962       98.2      98.2     98.8     95.3     99.5    102.0    103.3    103.5    102.6    100.4    100.0     98.1          100.0
  1963       98.2      98.1     98.9     95.8     99.4    101.8    103.2    103.4    102.3    100.4    100.5     98.3          100.0
  1964       98.2      97.9     98.8     96.4     99.4    101.6    103.0    103.1    101.8    100.4    100.8     98.4          100.0
  1965       98.4      97.9     98.9     97.2     99.6    101.5    101.8    103.0    101.6    100.5    101.0     98.3          100.0
  1966       98.6      97.9     99.0     97.8    100.0    101.6    100.4    103.1    101.4    100.7    101.1     98.4          100.0
  1967       98.6      97.9     99.0     98.2    100.3    101.8     98.9    103.2    101.4    101.0    101.1     98.4          100.0
  1968       98.7      97.9     99.0     98.5    100.5    101.9     98.3    103.2    101.3    101.1    101.1     98.3          100.0

             TABLE TOTAL-      9598.9            MEAN-     100.0          STD. DEVIATION-     2.0
D10A. SEASONAL FACTORS, ONE YEAR AHEAD
  YEAR       JAN       FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC            AVGE
  1969       98.7      97.9     99.0     98.6    100.6    102.0     98.0    103.2    101.3    101.1    101.0     98.3          100.0
```

## B

```
              AUG 1970   TRANSP., COMMUNICATION EMPLOYEES - ALBERTA        DBS CAT. NO. 72-508
D10.  FINAL SEASONAL FACTORS
  YEAR       JAN       FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC            AVGE
  1961       94.8      94.0     94.4     95.8    101.7    105.7    106.4    106.5  . 104.3    101.3     98.7     96.0          100.0
  1962       95.1      94.2     94.6     95.8    101.6    105.5    106.3    106.4    104.1    101.2     98.7     96.1          100.0
  1963       95.3      94.6     95.0     95.8    101.5    105.1    105.9    106.3    103.9    101.1     98.8     96.4          100.0
  1964       95.6      95.1     95.4     95.8    101.4    104.6    105.4    106.2    103.7    100.9     98.9     96.6          100.0
  1965       95.9      95.5     95.8     96.0    101.3    104.1    104.9    106.0    103.5    100.8     99.0     96.7          100.0
  1966       96.2      95.9     96.1     96.1    101.4    103.8    104.6    105.8    103.5    100.9     99.2     96.9          100.0
  1967       96.2      95.9     96.1     96.2    101.4    103.6    104.4    105.6    103.5    100.9     99.2     96.9          100.0
  1968       96.2      95.9     96.1     96.3    101.4    103.6    104.3    105.5    103.5    100.9     99.1     96.9          100.0

             TABLE TOTAL-      9597.9            MEAN-     100.0          STD. DEVIATION-     4.1
D10A. SEASONAL FACTORS, ONE YEAR AHEAD
  YEAR       JAN       FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC            AVGE
  1969       96.2      95.9     96.1     96.3    101.4    103.6    104.2    105.5    103.5    100.9     99.1     96.9          100.0
```

# Table V

AUG 1970 TOTAL TRADE EMPLOYEES - ALBERTA DBS CAT. NO. 72-508

D10. FINAL SEASONAL FACTORS

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 97.3 | 95.5 | 97.3 | 98.5 | 99.7 | 101.0 | 100.8 | 101.5 | 101.6 | 101.3 | 101.9 | 103.2 | 100.0 |
| 1962 | 97.4 | 95.7 | 97.3 | 98.6 | 99.8 | 101.0 | 100.8 | 101.4 | 101.6 | 101.2 | 101.8 | 103.1 | 100.0 |
| 1963 | 97.4 | 96.0 | 97.3 | 98.7 | 99.8 | 101.0 | 100.9 | 101.3 | 101.4 | 101.1 | 101.8 | 103.0 | 100.0 |
| 1964 | 97.4 | 96.3 | 97.4 | 98.8 | 99.8 | 101.1 | 100.9 | 101.1 | 101.1 | 100.9 | 101.6 | 102.7 | 99.9 |
| 1965 | 97.7 | 96.8 | 97.7 | 99.0 | 99.9 | 101.2 | 100.9 | 100.8 | 100.7 | 100.7 | 101.5 | 102.5 | 99.9 |
| 1966 | 97.9 | 97.1 | 97.9 | 99.2 | 99.9 | 101.3 | 100.9 | 100.6 | 100.4 | 100.6 | 101.6 | 102.5 | 100.0 |
| 1967 | 98.0 | 97.2 | 98.1 | 99.2 | 100.0 | 101.3 | 100.9 | 100.4 | 100.1 | 100.5 | 101.6 | 102.5 | 100.0 |
| 1968 | 98.1 | 97.2 | 98.2 | 99.3 | 100.0 | 101.4 | 100.9 | 100.3 | 99.9 | 100.5 | 101.5 | 102.5 | 100.0 |

TABLE TOTAL- 9597.0 MEAN- 100.0 STD. DEVIATION- 1.9

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1969 | 98.1 | 97.3 | 98.3 | 99.3 | 100.0 | 101.4 | 100.9 | 100.3 | 99.9 | 100.4 | 101.5 | 102.4 | 100.0 |

Table VI for summary). Nevertheless, the average value is bounded closely about the mean with a standard deviation of only 1.0. This implies a fairly constant range for the seasonal adjustment factor over time. That is, it would appear that the services as a whole are least affected by seasonal fluctuations in comparison to the other Alberta industrial sectors examined here.

Table VI

Final Seasonal Factors

| Sector | Range | | |
|---|---|---|---|
| | 1961 | 1969 | 1961-1969 |
| Total Alberta Labor Force | 96.1-104.2 | 97.1-103.4 | 96.1-104.2 |
| Total Services | 98.7-101.2 | 98.3-102.4 | 98.4-102.4 |
| Manufacturing | 95.2-103.5 | 97.9-103.2 | 95.2-103.3 |
| Transportation, Communication | 94.0-106.5 | 95.9-105.5 | 94.0-106.5 |
| Trade | 95.5-101.9 | 97.3-102.4 | 95.5-103.2 |

The seasonal factor for the total services peaks in June of every year, with the trough occurring around April, although in more recent years this would appear to be occurring around August and October (see Table VII).

Table VII

Final Seasonal Factors

| Sector | Approximate Month of Factor | |
|---|---|---|
| | Trough | Crest |
| Total Alberta Labor Force | April | July |
| Total Services | Aug. - Oct. | June |
| Manufacturing | Feb. - April | August |
| Transportation, Communication | February | June - Aug. |
| Trade | February | December |

The manufacturing sector in Alberta has the third largest deviating average value of the seasonal adjustment factors with a standard deviation of 2.0 (Table II). The range for the year 1961 of the seasonal adjustment factor was 95.2 to 103.5, while the projected factors for 1969 were expected to be 97.9 to 103.2 (Table VI). Therefore, over the whole time span the seasonal adjustment factors for manufacturing appear to be converging. While the peaks reached around August of every year remain at about the same value over time, it can be seen that the troughs occurring at the beginning of every year are definitely increasing in value.

Perhaps a word should be interjected here as to how the projected seasonal adjustment factors are derived. Estimates of the seasonal factors for one year ahead in the Shiskin program are based on work done by W. A. Beckett of the Department of Trade and Commerce (Canada). Projections are based on the formula:

$$S_{n+1} = S_n + \frac{1}{2} (S_n - S_{n-1})$$

Transportation, communication and utilities have the largest deviation of the sectors examined with a standard deviation of 4.1 (Table II). However, the seasonal fluctuations do appear to be becoming more stable over time as the range of the seasonal adjustment factors is decreasing. The range of the seasonal factors for the year 1961 was 94.0 to 106.5 and the estimated factors for 1969 ranged from 95.9 to 105.5 (Table VI). As in the manufacturing sector, transportation and communication has peaks that remain fairly constant

occurring around August, but the troughs of the factors do appear to be increasing (Table VI).

The retail and wholesale trade sectors have the second smallest distribution about the mean with a standard deviation of 1.9 (Table II). Again, the same pattern of movement of seasonal adjustment factors over time is experienced as with manufacturing and transportation, in that the troughs of the factors are increasing while the peaks achieve roughly the same yearly values. Thus, the range for 1961 was from 95.5 to 101.9, while the projected values for 1969 were expected to be 97.3 to 102.4 (Table VI).

The behavior of the seasonal adjustment factor for the trade sector is somewhat different, however, from that of the previously discussed sectors. While all series have reached their maximum seasonal value during the summer months, thus effectively deflating the actual number of persons employed, trade reaches its peak in the winter month of December. This is not altogether unexpected, what with the additional staff taken on by trade outlets for the inevitable Christmas buying season. The annual low value of the seasonal adjustment factor falls in line with the other economic series, occurring generally around the first few months of the year.

Having derived the seasonal adjustment factors, these are then divided into the original economic series to obtain the seasonally adjusted series. In effect, what is being done is to remove from the original series the seasonal

factor, thereby leaving only the CI, or the cyclical and irregular factors. These final seasonally adjusted figures are contained in Tables VIII - IX on the following pages. (Note: the original observations are printed at the end of this chapter in Tables XVI - XVII)

A summation can be made at this point by way of commenting on the behavior of the seasonal adjustment factors of the various sectors. A number of points by way of summation which may, or may not, have been made obvious to the reader will be discussed.

Firstly, there is little doubt about the fact that the seasonal adjustment factors are indeed changing in amplitude over time. More particularly, this movement appears to be manifesting itself chiefly in the increasing trough values of the seasonal adjustment factors. With the exception of total services, all of the remaining Alberta industrial sectors have increasing trough values, while the peaks remain fairly stable or decrease little.

Secondly, most of the industrial sectors follow a definite seasonal pattern regarding the amplitudes of their seasonal adjustment factors, peaking in the summer and hitting lows in the early part of the year. However, the trade sector achieves its peak seasonal adjustment factor in December. And, also, the total services depart from custom by having both their low and high seasonal adjustment factor values occur in the summer months.

Thirdly, over the time span observed here, the

# TABLE VIII

## FINAL SEASONALLY ADJUSTED SERIES

```
             JULY 1970   TOTAL LABOR FORCE - ALBERTA   (ALL FIRMS)      DBS CAT. NO. 72-508
D11.  FINAL SEASONALLY ADJUSTED SERIES
  YEAR      JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC              TOTAL
  1961   292573. 292722. 294013. 296470. 304189. 306073. 305956. 308339. 308976. 309681. 308014. 306513.          3633516.
  1962   306120. 305371. 310717. 314030. 310984. 315438. 319770. 320938. 320979. 320475. 320507. 322432.          3787755.
  1963   318723. 320395. 319473. 319636. 322429. 321883. 320369. 320203. 323816. 326218. 328743. 331306.          3873197.
  1964   334241. 334559. 332310. 333971. 334838. 335979. 338865. 339650. 341693. 344142. 347040. 345918.          4063299.
  1965   351227. 352684. 353215. 352774. 356542. 359061. 360274. 365186. 362699. 367469. 369366. 371825.          4322317.
  1966   368870. 374710. 376393. 380440. 377009. 379374. 381876. 382732. 385863. 388317. 388400. 393620.          4577599.
  1967   401925. 400580. 407513. 405515. 408926. 410458. 411933. 412859. 415407. 415329. 418770. 420503.          4929714.
  1968   422064. 422366. 422497. 427664. 426506. 425049. 423916. 424371. 428748. 434430. 444539. 444829.          5146975.

  AVGE   349480. 350423. 352017. 353812. 355178. 356665. 357869. 359285. 361022. 363257. 365672. 367118.
            TABLE TOTAL- 34334016.          MEAN- 357646.          STD. DEVIATION-  43520.
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             JULY 1970   TOTAL SERVICES EMPLOYEES - ALBERTA (ALL FIRMS) DBS CAT. NO. 72-508
D11.  FINAL SEASONALLY ADJUSTED SERIES
  YEAR      JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC              TOTAL
  1961    80081.  80071.  80923.  82662.  85358.  83766.  83949.  84533.  84871.  85043.  85190.  84775.          1001220.
  1962    84458.  84263.  86132.  86001.  84923.  87643.  87945.  88242.  88541.  88708.  89349.  89853.          1046057.
  1963    90287.  90367.  90768.  91652.  91846.  91430.  91748.  91794.  92704.  94713.  94678.  95391.          1107878.
  1964    96026.  95882.  95797.  96507.  97054.  97583.  99073. 100326. 101226. 102441. 102789. 103231.          1187933.
  1965   104317. 104304. 105085. 104442. 106187. 107176. 106577. 108139. 107173. 108308. 108761. 109004.          1279470.
  1966   108822. 111851. 111893. 114473. 111967. 113619. 115563. 115410. 116967. 117131. 116527. 117897.          1372118.
  1967   125635. 124182. 130179. 127813. 131461. 129132. 130036. 129188. 133028. 132653. 134571. 136183.          1564116.
  1968   135230. 135380. 134307. 136313. 138022. 140173. 139828. 141559. 142208. 145641. 150508. 147708.          1687375.

  AVGE   103107. 103350. 104448. 104984. 105852. 106315. 106846. 107399. 108340. 109330. 110297. 110505.
            TABLE TOTAL- 10246137.          MEAN- 106731.          STD. DEVIATION-  19428.
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             AUG 1970   TOTAL MANUFACTURING EMPLOYEES - ALBERTA          DBS CAT. NO. 72-508
D11.  FINAL SEASONALLY ADJUSTED SERIES
  YEAR      JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC              TOTAL
  1961   36484.5 36674.3 36062.8 35098.6 36737.7 37212.5 36776.0 37285.4 37280.2 37510.4 36865.7 37362.2          441350.2
  1962   37057.3 36764.5 37853.2 38080.9 37971.5 38616.0 39585.8 39615.2 39768.9 40029.7 40201.7 40273.1          465817.5
  1963   40409.4 40375.1 39949.3 41215.8 41161.4 40666.3 40299.6 40539.4 40761.0 40621.8 40705.4 40876.0          487580.2
  1964   41657.8 42606.8 42098.7 42120.0 41666.6 42036.8 42542.7 42274.2 43106.1 42638.6 43268.2 43310.9          509327.2
  1965   43413.2 43523.5 43767.7 42890.8 44298.9 44915.2 45981.2 46023.6 45394.9 45785.1 46335.2 47384.1          539712.9
  1966   45753.2 45846.3 45663.1 45820.5 45618.9 46041.7 47000.6 46474.2 46837.4 48365.2 48756.9 48780.9          560958.6
  1967   48261.0 48311.9 49586.6 49360.2 49059.3 48507.5 50437.9 48356.3 48523.5 48338.8 48454.4 48372.9          584070.1
  1968   50268.6 50271.0 50214.3 50558.8 49644.0 49645.6 43216.3 50004.6 49748.2 50065.7 50065.6 51060.7          594763.1

  AVGE   42913.1 43046.7 43024.4 43080.7 43269.9 43455.2 43230.0 43821.6 43927.5 44169.4 44331.6 44677.6
            TABLE TOTAL- 4183545.0          MEAN- 43578.6          STD. DEVIATION-  4504.5
```

# TABLE IX

## FINAL SEASONALLY ADJUSTED SERIES

AUG 1970 TRANSP., COMMUNICATION EMPLOYEES - ALBERTA DBS CAT. NO. 72-508

D11. FINAL SEASONALLY ADJUSTED SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 41756.8 | 41928.8 | 42269.4 | 43105.1 | 43967.8 | 43409.6 | 43880.5 | 43548.4 | 44025.2 | 44630.9 | 43878.2 | 43647.3 | 520047.6 |
| 1962 | 43660.4 | 43519.5 | 43959.3 | 44245.3 | 43794.9 | 44922.9 | 45450.0 | 45284.6 | 46008.8 | 45066.9 | 44574.7 | 44759.0 | 535234.9 |
| 1963 | 44475.3 | 44707.2 | 44636.4 | 44653.3 | 46105.2 | 46433.8 | 45228.9 | 45793.3 | 45696.7 | 45817.9 | 46439.0 | 46583.2 | 546569.8 |
| 1964 | 47137.6 | 47238.0 | 47087.6 | 47065.5 | 47157.3 | 46842.1 | 47232.6 | 47359.4 | 47746.8 | 47586.3 | 48028.7 | 47739.5 | 568271.2 |
| 1965 | 47842.1 | 48352.3 | 47829.1 | 47103.2 | 47071.9 | 47061.3 | 47458.4 | 47369.2 | 47327.9 | 47939.9 | 47983.1 | 48801.6 | 572139.6 |
| 1966 | 48131.7 | 48506.5 | 48305.7 | 49126.1 | 47946.0 | 47786.3 | 47892.6 | 48404.5 | 48597.3 | 48680.7 | 48907.0 | 49753.3 | 582037.4 |
| 1967 | 49697.3 | 49848.4 | 48835.0 | 49589.9 | 49412.6 | 49790.4 | 50579.1 | 50101.4 | 49446.8 | 49344.8 | 48993.6 | 48494.0 | 595133.1 |
| 1968 | 48554.2 | 48370.2 | 48575.5 | 48931.4 | 49696.2 | 49313.2 | 47949.7 | 48230.8 | 49165.1 | 49154.1 | 49423.4 | 49231.0 | 586594.6 |
| AVGE | 46413.2 | 46558.8 | 46562.1 | 46727.5 | 46892.7 | 46944.9 | 46958.9 | 47011.4 | 47251.8 | 47277.7 | 47278.4 | 47376.1 | |

TABLE TOTAL- 4505997.0 MEAN- 46937.5 STD. DEVIATION- 2165.6

AUG 1970 TOTAL TRADE EMPLOYEES - ALBERTA DBS CAT. NO. 72-508

D11. FINAL SEASONALLY ADJUSTED SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 55306.5 | 55583.3 | 56321.6 | 56472.1 | 58352.0 | 58223.2 | 58209.9 | 58404.9 | 58446.1 | 59136.0 | 59070.0 | 59103.8 | 692629.1 |
| 1962 | 58754.0 | 58291.1 | 59415.2 | 60172.0 | 60226.1 | 60303.7 | 60188.8 | 60526.8 | 60555.4 | 60465.9 | 60681.4 | 60728.8 | 720408.8 |
| 1963 | 60467.3 | 60708.2 | 60926.9 | 60598.0 | 60407.2 | 61085.4 | 61573.4 | 61877.1 | 62511.1 | 62796.7 | 62875.0 | 63503.0 | 739229.1 |
| 1964 | 63523.0 | 64038.9 | 63549.2 | 63141.2 | 63634.1 | 63506.5 | 64049.1 | 64297.0 | 64389.6 | 64518.7 | 64845.8 | 64824.2 | 768316.9 |
| 1965 | 65532.1 | 66131.1 | 65621.9 | 67374.3 | 67596.9 | 67700.4 | 68202.4 | 68536.3 | 69719.1 | 70022.6 | 70337.0 | 70332.5 | 817106.6 |
| 1966 | 71385.9 | 72181.3 | 73019.3 | 72896.9 | 73450.3 | 73755.8 | 73634.7 | 74370.9 | 74019.8 | 74550.1 | 74828.8 | 75511.0 | 883604.6 |
| 1967 | 76035.3 | 75826.9 | 76476.3 | 76385.1 | 76108.7 | 77771.3 | 77398.6 | 76792.9 | 77416.8 | 77894.3 | 78858.7 | 78843.1 | 925807.9 |
| 1968 | 79441.4 | 79795.6 | 80028.4 | 80077.8 | 80614.1 | 79797.6 | 80282.6 | 79751.2 | 80741.7 | 82024.9 | 82921.3 | 84033.0 | 969509.7 |
| AVGE | 66305.6 | 66582.0 | 66907.3 | 67139.6 | 67548.6 | 67767.9 | 67942.4 | 68069.6 | 68474.9 | 68926.1 | 69302.3 | 69609.9 | |

TABLE TOTAL- 6516575.0 MEAN- 67890.9 STD. DEVIATION- 8029.9

seasonal adjustment factors of the various Alberta industrial sectors are seen to be converging. However, such is not the case with the total services. Their seasonal adjustment factors are seen to be diverging in more recent years.

Fourthly, the range of the seasonal adjustment factors for the total services is the smallest of any of the industrial sectors examined. This holds for the year 1969 as well, in spite of the observation made above that the seasonal factor of the services appears to be diverging.

Fifthly, the seasonal adjustment factor for the total services is tightly distributed about its mean. Of the five industrial sectors discussed so far, the total services possessed the smallest standard deviation, namely, 1.0.

## CYCLICAL ANALYSIS

The seasonally adjusted data contains the cyclical and irregular factors of the original data. The problem is now to sort out the irregular factor from the cyclical factor. The moving average curve used to estimate the cyclical component is selected on the basis of a preliminary estimate of the I/C ratio. This is a ratio of the average change in the monthly irregular factor over the average change in the monthly cyclical factor. Depending on the value of the I/C ratio, the program selects a moving average according to the following data.

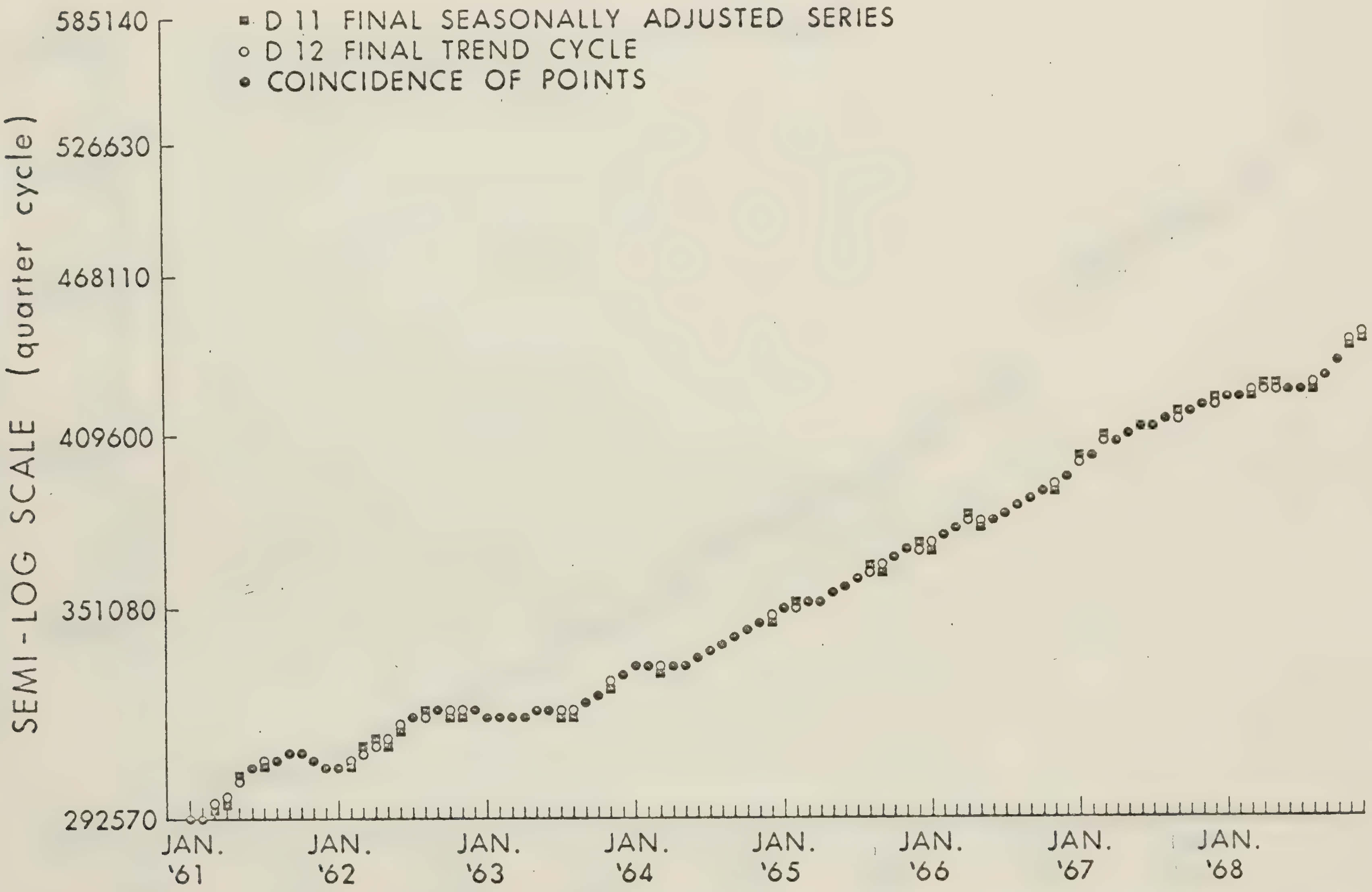
| I/C RATIO | LENGTH OF MOVING AVERAGE |
|---|---|
| 0 - .99 | 9 - term Henderson |
| 1.00 - 3.49 | 13 - term Henderson |
| 3.50 + | 23 - term Henderson |

The plotted values of the seasonally adjusted data and the cyclical factors are printed on the following Charts VII - XI and Tables X - XI. It can be readily seen that the seasonally adjusted data corresponds quite closely to the cyclical factor by itself. This alone provides a measure of the value of the Shiskin program in seasonally adjusting the original observations, when the results correspond as closely as they do to the pure cyclical factor. Therefore, the reason for seasonally adjusting data becomes even more apparent as cyclical movements are faithfully reproduced.

Over the time span of 1961 to 1968, it is observed that the secular pattern for all five series has been rising. The increase of the total Alberta services is probably the most dramatic of all, followed by that of the total labor force. The important point regarding this secular growth is that over the indicated time span the Alberta labor force grew by 52%, while over the same period total services grew by 85%.

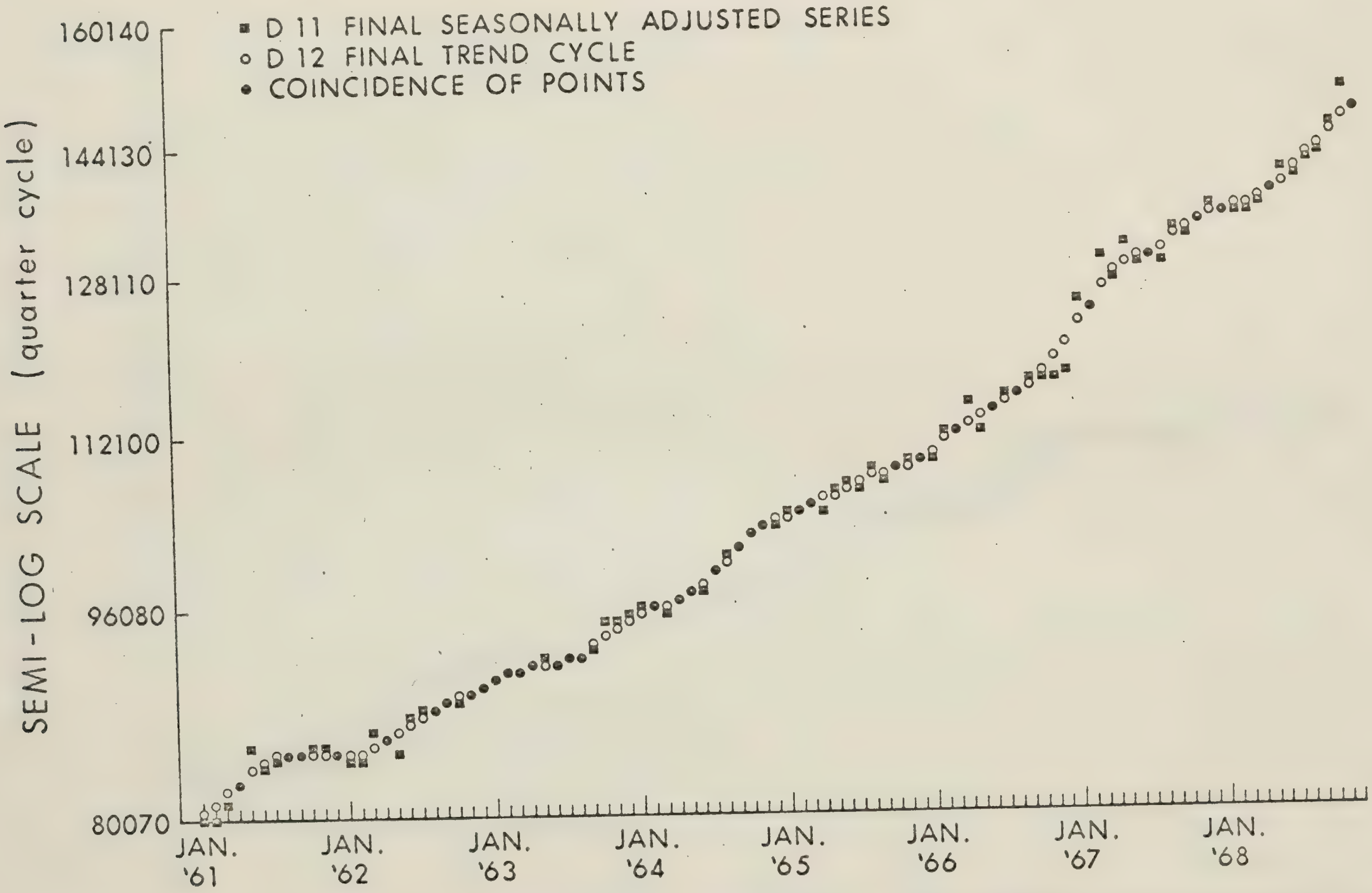
One summary measure of the cyclical factor provided by the computer program is called the MCD, or the "months for cyclical dominance". This is simply a measure of the number of months that must go by in the I/C ratio before the cyclical factor, which is cumulative in the short run, becomes greater than the irregular factor, which does not cumulate. That is, the MCD is taken as the number of months which must occur before the I/C ratio falls below one. The MCD provides the economist with some idea of how many months must pass

Chart VII



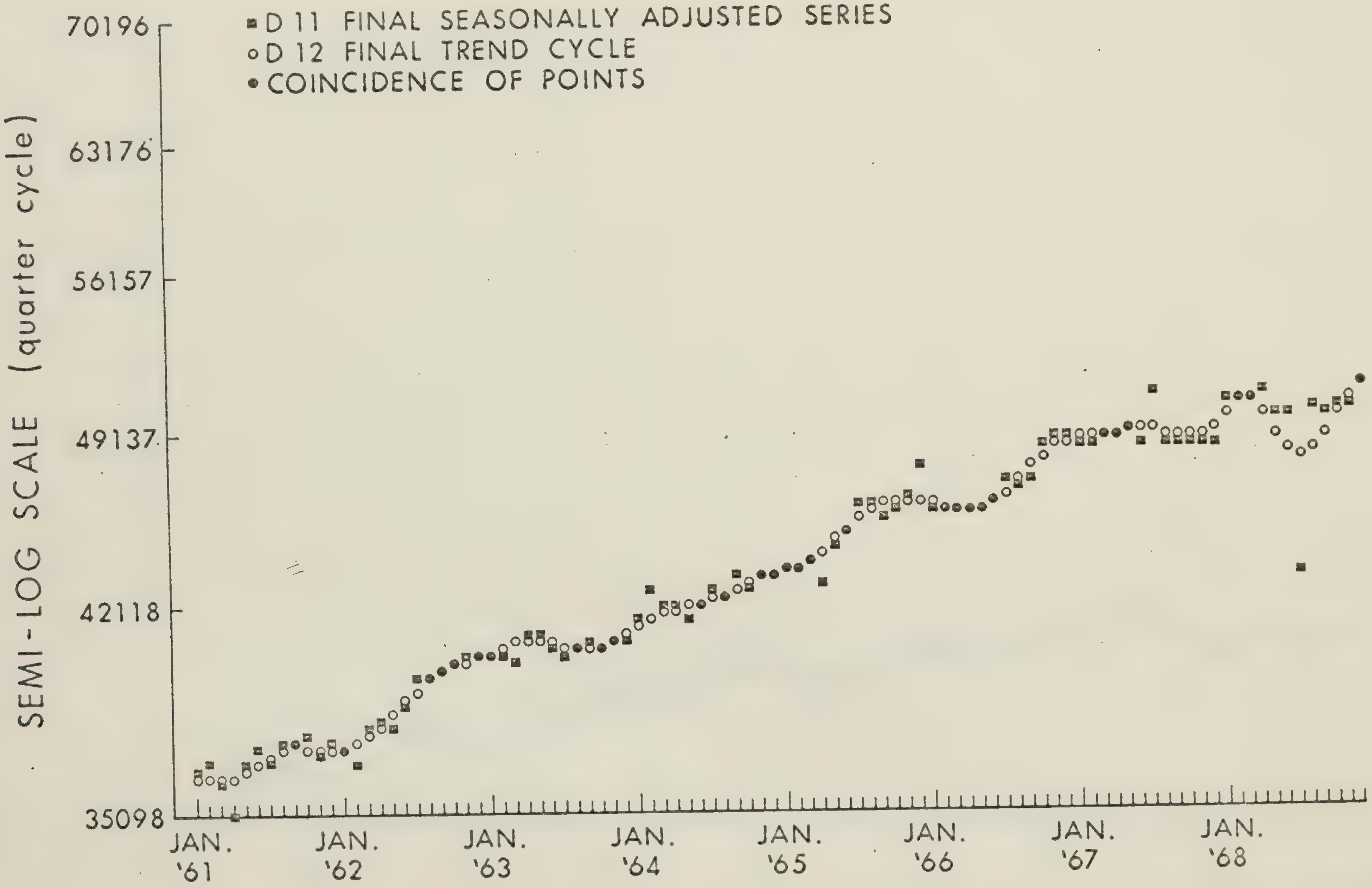
JULY 1970 TOTAL LABOR FORCE - ALBERTA DBS CAT. No. 72-508

Chart VIII



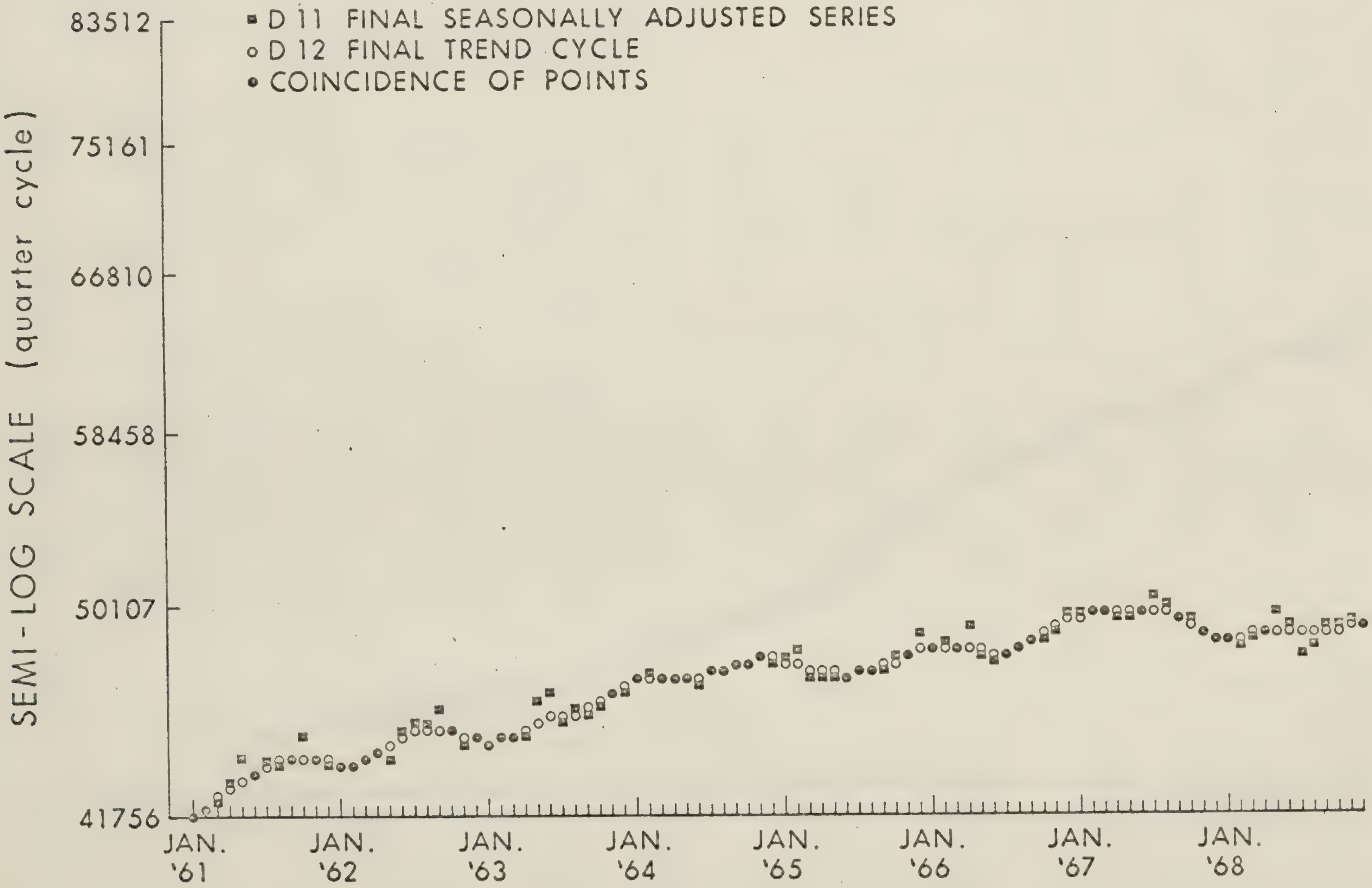
JULY 1970 TOTAL SERVICES EMPLOYEES - ALBERTA (ALL FIRMS) DBS CAT. No. 72-508

Chart IX



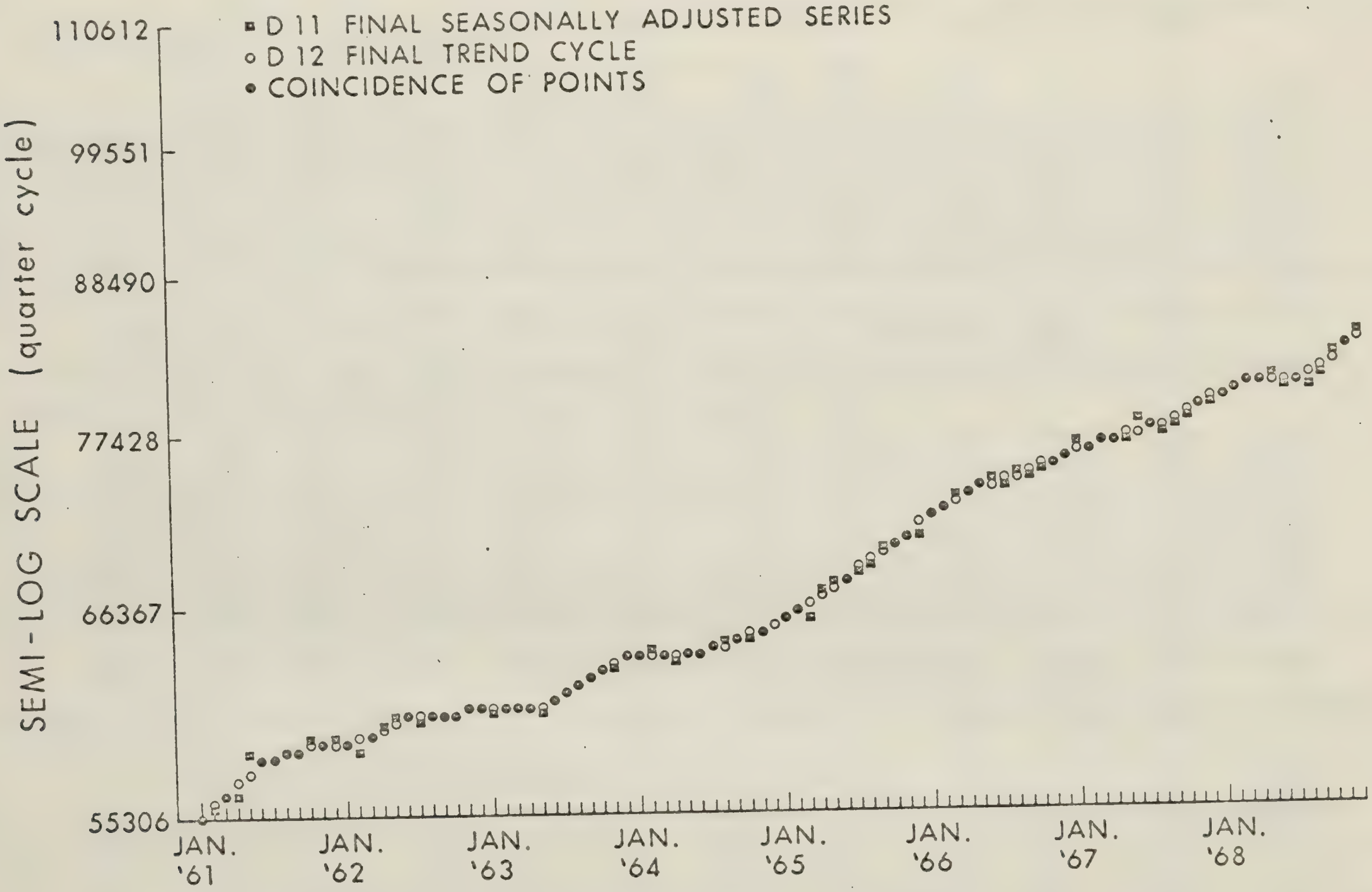
AUG. 1970 TOTAL MANUFACTURING EMPLOYEES - ALBERTA DBS CAT. No. 72-508

Chart X



AUG. 1970 TRANSP., COMMUNICATION EMPLOYEES - ALBERTA DBS CAT. No. 72-508

Chart XI



AUG. 1970 TOTAL TRADE EMPLOYEES - ALBERTA DBS CAT. No. 72-508

# Table X

```
                    JULY 1970   TOTAL LABOR FORCE - ALBERTA    (ALL FIRMS)       DBS CAT. NO. 72-508
D12.  FINAL TREND CYCLE - HENDERSON CURVE
                    9-TERM MOVING AVERAGE SELECTED.   I/C RATIO IS  0.98
 YEAR       JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC             TOTAL
 1961   291173.  293274.  295927.  299036.  302428.  305223.  307102.  308275.  308869.  308855.  307901.  306595.          3634703.
 1962   306290.  307438.  309535.  311926.  314302.  316573.  318651.  320247.  321090.  321139.  320941.  320706.          3788836.
 1963   320232.  319802.  319907.  320559.  321074.  321047.  321029.  321590.  323239.  325953.  329057.  331624.          3875108.
 1964   333177.  333782.  333747.  333891.  334783.  336346.  338091.  340033.  342006.  343904.  345927.  348173.          4063857.
 1965   350165.  351749.  353093.  354348.  356105.  358615.  361228.  363488.  365646.  367507.  368938.  370152.          4221028.
 1966   371920.  374075.  376281.  377995.  378999.  379726.  381239.  383252.  385292.  387464.  390234.  393947.          4580421.
 1967   398145.  402094.  405080.  407140.  408770.  410325.  411773.  413268.  414684.  416468.  418456.  420199.          4926399.
 1968   421510.  422653.  423757.  424837.  425228.  424912.  424595.  425833.  429625.  434792.  440150.  445384.          5143312.

 AVGE   349076.  350603.  352171.  353723.  355211.  356596.  357963.  359498.  361306.  363260.  365200.  367097.
             TABLE TOTAL- 34333312.          MEAN- 357639.         STD. DEVIATION-  43362.
```

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                    JULY 1970   TOTAL SERVICES EMPLOYEES - ALBERTA (ALL FIRMS) DBS CAT. NO. 72-508
D12.  FINAL TREND CYCLE - HENDERSON CURVE
                    13-TERM MOVING AVERAGE SELECTED.   I/C RATIO IS  1.05
 YEAR       JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC             TOTAL
 1961    80503.   81199.   81594.   82799.   83548.   84112.   84489.   84702.   84786.   84800.   84836.   84854.          1002621.
 1962    84852.   84963.   85261.   85743.   86348.   86985.   87578.   88102.   88581.   89007.   89386.   89802.          1046605.
 1963    90279.   90725.   91084.   91323.   91470.   91609.   91841.   92259.   92897.   93683.   94480.   95145.          1106794.
 1964    95608.   95905.   96162.   96534.   97133.   97988.   99026.  100128.  101174.  102114.  102885.  103466.          1188122.
 1965   103943.  104386.  104867.  105402.  105964.  106513.  107037.  107459.  107785.  108095.  108562.  109253.          1279263.
 1966   110068.  110930.  111777.  112565.  113328.  114043.  114728.  115487.  116390.  117495.  118865.  120576.          1376250.
 1967   122611.  124732.  126605.  128069.  129083.  129792.  130446.  131238.  132232.  133319.  134253.  134875.          1557252.
 1968   135222.  135525.  135996.  136723.  137695.  138925.  140339.  141825.  143389.  144893.  146316.  147493.          1684338.

 AVGE   102886.  103546.  104218.  104895.  105571.  106246.  106935.  107650.  108404.  109176.  109948.  110683.
             TABLE TOTAL- 10241216.          MEAN- 106679.         STD. DEVIATION-  19271.
```

```
                    AUG 1970   TOTAL MANUFACTURING EMPLOYEES - ALBERTA           DBS CAT. NO. 72-508
D12.  FINAL TREND CYCLE - HENDERSON CURVE
                    13-TERM MOVING AVERAGE SELECTED.   I/C RATIO IS  1.65
 YEAR       JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC             TOTAL
 1961   36223.6  36167.6  36171.3  36241.6  36410.1  36664.0  36944.4  37168.9  37263.3  37236.9  37191.0  37198.8          440891.2
 1962   37250.2  37378.8  37513.7  37952.7  38349.4  38771.1  39183.6  39544.3  39839.9  40042.3  40159.9  40261.3          466352.1
 1963   40405.6  40572.6  40709.4  40791.9  40806.1  40755.8  40659.5  40567.7  40545.9  40645.6  40873.5  41166.4          488499.7
 1964   41455.2  41706.7  41836.6  41999.3  42072.2  42161.6  42306.7  42510.6  42734.5  42952.4  43129.9  43260.3          508175.6
 1965   43358.4  43472.1  43631.6  44026.1  44460.4  44925.3  45358.8  45710.3  45947.3  46063.9  46091.4  46063.4          539158.6
 1966   45976.9  45867.9  45792.3  45762.9  45857.6  46085.5  46450.0  46922.9  47444.8  47917.9  48270.1  48492.6          560830.8
 1967   48576.0  48603.8  48857.6  48803.0  48991.3  49079.3  49012.9  48814.5  48620.5  48560.0  48720.5  49110.5          585549.8
 1968   49716.4  50175.0  50142.3  49620.3  48835.9  48116.4  47818.0  48070.2  48717.0  49510.2  50249.2  50941.2          591912.3

 AVGE   42870.3  42993.0  43081.8  43150.4  43221.6  43319.9  43466.7  43663.6  43889.1  44116.1  44335.7  44561.8
             TABLE TOTAL- 4181330.0          MEAN- 43555.5         STD. DEVIATION-  4410.6
```

Table XI

```
                 AUG 1970   TRANSP., COMMUNICATION EMPLOYEES - ALBERTA      DBS CAT. NO. 72-508
C12.  FINAL TREND CYCLE - HENDERSON CURVE
                 13-TERM MOVING AVERAGE SELECTED.   I/C RATIO IS  1.86
  YEAR      JAN     FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC              TOTAL
  1961   41830.3 42135.1 42465.6 42812.3 43159.0 43469.2 43718.4 43881.0 43955.1 43945.9 43883.8 43791.8          519047.6
  1962   43717.0 43721.6 43854.0 44120.4 44464.7 44799.2 45054.6 45175.6 45154.6 45024.2 44825.5 44644.9          534556.1
  1963   44588.1 44667.0 44855.0 45101.3 45334.7 45510.7 45624.6 45710.1 45835.1 46045.4 46342.1 46669.1          546283.0
  1964   46930.7 47083.8 47132.3 47113.7 47090.8 47122.9 47227.9 47394.8 47568.8 47722.3 47826.0 47852.6          568066.6
  1965   47786.7 47655.5 47493.9 47336.7 47221.8 47185.5 47240.5 47378.3 47570.0 47773.1 47969.8 48156.9          570768.6
  1966   48304.4 48368.4 48335.5 48245.1 48151.7 48087.3 48105.8 48239.5 48489.6 48814.5 49157.6 49442.1          581741.3
  1967   49631.1 49720.1 49750.5 49759.6 49783.0 49828.9 49849.6 49780.3 49593.9 49300.1 48953.9 48673.1          594624.0
  1968   48560.4 48621.1 48759.6 48883.6 48937.9 48916.9 48865.9 48848.0 48906.4 49028.4 49159.1 49318.4          586805.6

  AVGE   46418.7 46496.6 46580.8 46671.6 46767.9 46865.1 46960.9 47050.9 47134.1 47206.7 47264.7 47318.6
           TABLE TOTAL- 4501856.0          MEAN- 46894.3          STD. DEVIATION-  2143.9
```

```
                 AUG 1970   TOTAL TRADE EMPLOYEES - ALBERTA                 DBS CAT. NO. 72-508
D12.  FINAL TREND CYCLE - HENDERSON CURVE
                 13-TERM MOVING AVERAGE SELECTED.   I/C RATIO IS  1.13
  YEAR      JAN     FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC              TOTAL
  1961   55447.0 55914.6 56456.0 57022.9 57571.7 58006.4 58322.1 58541.4 58686.0 58766.0 58807.6 58852.2          692393.5
  1962   58941.0 59114.7 59379.1 59704.1 60024.3 60268.4 60413.6 60479.1 60515.0 60561.9 60613.7 60641.4          720657.0
  1963   60632.9 60608.5 60602.4 60654.5 60815.1 61094.5 61470.9 61902.1 62349.8 62768.7 63112.2 63364.9          739376.3
  1964   63515.5 63564.6 63554.6 63547.2 63588.7 63714.5 63911.4 64132.0 64364.1 64574.5 64787.7 65058.6          769313.3
  1965   65416.5 65864.6 66351.8 66846.9 67341.9 67839.3 68342.8 68849.4 69348.2 69869.2 70428.5 70989.7          817488.6
  1966   71556.0 72109.3 72628.3 73074.8 73414.4 73656.5 73844.5 74048.7 74304.8 74622.0 74997.5 75379.4          883636.3
  1967   75717.0 76001.6 76255.6 76487.4 76712.9 76947.4 77198.9 77467.4 77768.1 78122.6 78516.5 78957.6          926153.0
  1968   79397.3 79761.1 79999.5 80092.0 80080.1 80050.2 80158.8 80516.6 81122.5 81840.9 82583.0 83310.4          968912.3

  AVGE   66328.0 66617.3 66903.4 67178.7 67443.6 67697.1 67957.8 68242.1 68557.3 68890.7 69230.8 69569.3
           TABLE TOTAL- 6516893.0          MEAN- 67884.3          STD. DEVIATION-  8015.1
```

before a movement in seasonally adjusted data can be taken to reflect cyclical change: in other words, how many months must go by before a change in a time series is economically significant.

Therefore, from Table XII below and XIII - XIV following, changes in the Alberta labor force on a monthly basis can be taken to reflect cyclical changes. For services and trade, two very related sectors, cyclical changes can be taken to be indicated in the employment data about every second month. And finally, manufacturing and transportation and communication have economically significant changes about every third month.

Table XII

MONTHS FOR CYCLICAL DOMINANCE

| SERIES | MCD |
|---|---|
| Total Alberta Labor Force | 1 |
| Total Services | 2 |
| Manufacturing | 3 |
| Transportation, Communication | 3 |
| Trade | 2 |

One of the more interesting features of the MCD is that it provides the economist with an alternative method for deriving the cyclical factor. Moving averages of a period equal to the MCD will trace out the cyclical pattern better than a seasonally adjusted series, but this method has one drawback in that the resulting series is not quite up to date. They are therefore to be considered as useful supplements to, but not replacements for, seasonally adjusted

# Table XIII

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                 JULY 1970   TOTAL LABOR FORCE - ALBERTA   (ALL FIRMS)      DBS CAT. NO. 72-508
F 1. MCD MOVING AVERAGE
           MCC IS  1
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                 JULY 1970   TOTAL SERVICES EMPLOYEES - ALBERTA (ALL FIRMS) DBS CAT. NO. 72-508
F 1. MCD MOVING AVERAGE
           MCC IS  2
 YEAR      JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC             TOTAL
 1961   *******   90070.   80497.   81792.   84010.   84562.   83857.   84241.   84702.   84957.   85116.   84982.          918792.
 1962    84616.   84360.   85197.   86066.   85462.   86283.   87794.   88093.   88391.   88625.   89029.   89601.         1043518.
 1963    90070.   90577.   90817.   91210.   91749.   91638.   91589.   91771.   92249.   93709.   94695.   95034.         1105109.
 1964    95708.   95954.   95840.   96152.   96781.   97319.   98328.   99699.  100776.  101833.  102615.  103010.         1184014.
 1965   103774.  104311.  104694.  104763.  105315.  106681.  106876.  107358.  107656.  107741.  108535.  108882.         1276584.
 1966   108913.  110336.  111572.  113183.  113220.  112793.  114591.  115486.  116189.  117049.  116829.  117212.         1367671.
 1967   121766.  124909.  127181.  128999.  129640.  130297.  129609.  129637.  131108.  132840.  133612.  135377.         1554972.
 1968   135707.  135305.  135094.  135560.  137167.  139097.  140000.  140693.  141883.  143924.  148074.  149108.         1681612.

 AVGE   105794.  103229.  103899.  104716.  105418.  106084.  106581.  107122.  107869.  108835.  109813.  110401.
             TABLE TOTAL- 10132242.
```

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                 AUG 1970   TOTAL MANUFACTURING EMPLOYEES - ALBERTA          DBS CAT. NO. 72-508
F 1. MCD MOVING AVERAGE
           MCC IS  3
 YEAR      JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC             TOTAL
 1961  *******  36407.2  35945.3  35966.4  36349.6  36908.7  37091.3  37113.9  37358.6  37218.8  37246.1  37095.0         404700.6
 1962  37061.3  37225.0  37566.2  37968.5  38222.8  38724.4  39272.3  39656.6  39804.6  40000.1  40168.2  40294.7         465964.4
 1963  40352.5  40244.6  40513.4  40775.5  41014.5  40709.1  40501.7  40533.3  40640.7  40696.0  40734.4  41079.7         487795.1
 1964  41713.5  42121.1  42275.2  41961.7  41941.1  42082.0  42284.5  42641.0  42673.0  43004.3  43072.6  43330.8         509100.5
 1965  43415.3  43563.1  43394.0  43652.5  44035.0  45065.1  45640.0  45799.9  45734.5  45838.4  46501.4  46490.8         539135.1
 1966  46327.9  45754.2  45776.6  45700.8  45827.0  46220.4  46505.5  46770.7  47225.6  47986.5  48634.3  48599.6         561328.8
 1967  48451.2  48286.5  48596.2  48835.4  48809.0  49334.9  49100.5  49105.9  48406.2  48438.9  48388.7  49032.0         584875.0
 1968  49623.5  50251.3  50343.0  50139.0  49949.4  47501.9  47622.2  47656.4  49939.5  49959.8  50397.3  *******         543402.1

 AVGE  43851.4  42394.7  43050.6  43125.0  43268.5  43318.3  43502.2  43659.7  43972.8  44142.8  44392.8  43703.2
             TABLE TOTAL- 4096271.0
```

Table XIV

```
                AUG 1970   TRANSP., COMMUNICATION EMPLOYEES - ALBERTA        DBS CAT. NO. 72-508
F 1. MCD MOVING AVERAGE
            MCD IS  2
YEAR         JAN       FEB       MAR       APR       MAY       JUN       JUL       AUG       SEP       OCT       NOV       DEC            TOTAL
1961     ******* 41985.0 42434.4 43114.1 43494.1 43752.6 43612.8 43818.0 44068.1 44178.1 44052.1 43728.6        478237.8
1962     43609.1 43712.7 43907.7 43996.1 44317.7 44719.3 45219.1 45581.1 45453.4 45216.8 44800.1 44603.0        535135.9
1963     44647.1 44606.3 44665.6 45131.6 45730.8 45922.6 45818.6 45572.9 45769.3 45984.5 46280.0 46736.6        546865.7
1964     47002.9 47171.1 47130.4 47103.4 47021.6 47077.3 47144.7 47446.3 47564.2 47787.3 47784.8 47870.1        568103.9
1965     47977.9 48007.8 47761.5 47334.7 47078.8 47197.1 47296.3 47385.1 47545.6 47750.3 48241.5 48305.5        571882.0
1966     48479.9 48314.6 48646.1 48459.3 48296.1 47874.9 48027.8 48298.1 48560.8 48728.3 49113.6 49452.5        582241.9
1967     49766.3 49793.6 49757.7 49612.5 49597.6 49927.4 50157.0 50042.4 49631.0 49261.7 48944.1 48690.6        595171.5
1968     48472.3 48500.0 48625.7 49067.7 49313.6 48986.4 48497.5 48448.5 48850.0 49247.6 49269.5 *******        537279.3

AVGE     47136.6 46511.4 46616.1 46727.4 46855.0 46932.2 46971.8 47074.0 47180.3 47269.3 47310.7 47053.8
              TABLE TOTAL- 4414881.0
```

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                AUG 1970   TOTAL TRADE EMPLOYEES - ALBERTA                   DBS CAT. NO. 72-508
F 1. MCD MOVING AVERAGE
            MCD IS  2
YEAR         JAN       FEB       MAR       APR       MAY       JUN       JUL       AUG       SEP       OCT       NOV       DEC            TOTAL
1961     ******* 55444.5 55952.4 56396.8 57412.0 58237.6 58216.5 58307.4 58425.5 58791.1 59103.0 59086.9        635474.1
1962     58529.3 58572.5 58903.1 59793.6 60199.0 60264.9 60246.3 60357.8 60541.1 60510.6 60573.6 60705.1        719596.3
1963     60558.1 60587.8 60757.5 60712.4 60502.6 60746.3 61329.4 61725.3 62194.1 62653.9 62835.9 63189.0        737842.1
1964     63513.0 63780.9 63794.0 63345.2 63387.7 63570.3 63777.8 64173.0 64343.3 64454.1 64682.2 64835.0        767656.2
1965     65178.2 65831.6 65976.5 66498.1 67485.6 67648.6 67951.4 68369.3 69127.6 69870.8 70179.3 70334.8        814352.2
1966     70859.1 71783.5 72600.3 72958.1 73173.6 73603.0 73695.2 74002.8 74195.4 74284.9 74689.4 75169.9        881015.1
1967     75773.1 75931.1 76151.6 76430.7 76246.9 76940.0 77584.9 77095.8 77104.8 77655.5 78376.4 78850.9        924141.6
1968     79142.3 79618.6 79912.0 80053.1 80345.9 80205.8 80040.1 80016.9 80246.4 81383.3 82473.1 83477.1        966914.5

AVGE     67713.2 66443.8 66744.6 67023.4 67344.1 67658.3 67855.2 68006.0 68272.3 68700.5 69114.1 69456.1
              TABLE TOTAL- 6446908.0
```

series in any economic analysis.

The "average duration of run" refers to the average number of consecutive monthly changes in the same direction for any factor. For a random series, short runs occur much more often than long runs, and the expected average duration of a run is only 1.5, which in this case would be months. For a random series of 120 observations, the average duration of a run falls between 1.36 and 1.75, 95% of the time. This concept provides a means of determining whether monthly movements of an economic series are departing significantly from randomness.

It is observed in the following Table XV that the irregular factor removed from the five economic sectors of Alberta are essentially random. In the seasonally adjusted series, however, only one series falls within the specified range for randomness. Nevertheless, this does not mean that these series are not random, but rather that the irregular factor is so large in the seasonally adjusted series

Table XV

AVERAGE DURATION OF RUN

| Sector | Irregular (1) | Seasonally Adjusted (Cl) | Moving Average (Period=MCD |
|---|---|---|---|
| Total Alberta Labor Force | 1.61 | 2.71 | 2.71 |
| Total Services | 1.51 | 1.94 | 4.95 |
| Manufacturing | 1.61 | 1.61 | 2.91 |
| Transportation, Communication | 1.46 | 1.76 | 3.44 |
| Trade | 1.64 | 2.21 | 4.48 |

that it dominates the monthly movements.

The moving average of a random series has an expected average duration of run equal to 2.0, regardless of the period of the MCD moving average. The average duration of runs for the MCD moving average are all between 2.71 and 4.95 for the five sectors examined here, thus they exceed beyond reasonable limits the figure expected for a random series, and therefore represent the cyclical movements of the series.

# TABLE XVI

## ORIGINAL DATA

JULY 1970 TOTAL LABOR FORCE - ALBERTA (ALL FIRMS) DBS CAT. NO. 72-508 P. 1, SERIES ATLF

B 1. ORIGINAL SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 283300. | 282400. | 284000. | 285000. | 304700. | 316000. | 318700. | 319300. | 318200. | 314000. | 308500. | 300300. | 3634400. |
| 1962 | 296800. | 295200. | 300500. | 302000. | 311500. | 325600. | 332900. | 332200. | 330100. | 324600. | 320900. | 315800. | 3788100. |
| 1963 | 309200. | 310700. | 309700. | 307800. | 322700. | 332000. | 333300. | 331100. | 332400. | 330000. | 329100. | 324700. | 3872700. |
| 1964 | 324400. | 325500. | 323200. | 321900. | 334900. | 346300. | 352000. | 350500. | 349800. | 347200. | 346900. | 338800. | 4061400. |
| 1965 | 341400. | 344600. | 345100. | 340900. | 356500. | 369800. | 373700. | 376000. | 370300. | 369700. | 368800. | 363800. | 4320600. |
| 1966 | 359300. | 367300. | 369300. | 368300. | 377100. | 390600. | 395500. | 393600. | 393400. | 390100. | 387900. | 385400. | 4577800. |
| 1967 | 391400. | 392900. | 400700. | 393200. | 408900. | 422400. | 426300. | 424200. | 423100. | 416700. | 418100. | 411700. | 4929600. |
| 1968 | 411000. | 414500. | 416100. | 415100. | 426500. | 437400. | 438500. | 435700. | 436500. | 435500. | 443500. | 435400. | 5145700. |
| AVGE | 339600. | 341638. | 343575. | 341775. | 355350. | 367513. | 371363. | 370325. | 369225. | 365975. | 365463. | 359488. | |

TABLE TOTAL- 34330000. MEAN- 357604. STD. DEVIATION- 44785.

JULY 1970 TOTAL SERVICES EMPLOYEES - ALBERTA (ALL FIRMS) DBS CAT. NO. 72-508 P. 1, SERIES ATSE2

B 1. ORIGINAL SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 80000. | 80700. | 81200. | 81600. | 85000. | 84800. | 84100. | 83900. | 84900. | 84700. | 85800. | 84300. | 1001000. |
| 1962 | 84400. | 85000. | 86500. | 84900. | 84600. | 88800. | 88100. | 87600. | 88500. | 88300. | 89900. | 89300. | 1045900. |
| 1963 | 90100. | 91800. | 91300. | 90600. | 91400. | 92800. | 92000. | 91100. | 92600. | 94200. | 95100. | 94800. | 1107800. |
| 1964 | 95600. | 97000. | 96500. | 95500. | 96700. | 99200. | 99400. | 99400. | 101000. | 101600. | 102900. | 102500. | 1187300. |
| 1965 | 103700. | 105800. | 106100. | 103600. | 106000. | 109200. | 107000. | 106900. | 106800. | 107100. | 108500. | 108100. | 1278800. |
| 1966 | 108100. | 113700. | 113200. | 113700. | 112200. | 116000. | 116000. | 113900. | 116500. | 115600. | 116100. | 117000. | 1372000. |
| 1967 | 124500. | 126300. | 131800. | 127100. | 131900. | 132100. | 130600. | 127300. | 132400. | 130700. | 133900. | 135100. | 1563700. |
| 1968 | 133900. | 137800. | 136600. | 135700. | 138600. | 143500. | 140400. | 139300. | 141500. | 143300. | 149600. | 146500. | 1686700. |
| AVGE | 102538. | 104763. | 105400. | 104088. | 105800. | 108300. | 107200. | 106175. | 108025. | 108188. | 110225. | 109700. | |

TABLE TOTAL- 10243200. MEAN- 106700. STD. DEVIATION- 19385.

AUG 1970 TOTAL MANUFACTURING EMPLOYEES - ALBERTA DBS CAT. NO. 72-508

B 1. ORIGINAL SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 35800.0 | 36000.0 | 35600.0 | 33400.0 | 36600.0 | 38000.0 | 38000.0 | 38600.0 | 38300.0 | 37700.0 | 36800.0 | 36600.0 | 441400.0 |
| 1962 | 36400.0 | 36100.0 | 37400.0 | 35300.0 | 37300.0 | 39400.0 | 40900.0 | 41000.0 | 40800.0 | 40200.0 | 40200.0 | 39500.0 | 466000.0 |
| 1963 | 39700.0 | 39600.0 | 39500.0 | 39500.0 | 40900.0 | 41400.0 | 41600.0 | 41900.0 | 41700.0 | 40800.0 | 40900.0 | 40200.0 | 487700.0 |
| 1964 | 40900.0 | 41700.0 | 41600.0 | 40600.0 | 41400.0 | 42700.0 | 43800.0 | 43600.0 | 43900.0 | 42800.0 | 43600.0 | 42600.0 | 509200.0 |
| 1965 | 42700.0 | 42600.0 | 43300.0 | 41700.0 | 44100.0 | 45600.0 | 46800.0 | 47400.0 | 46100.0 | 46000.0 | 46800.0 | 46600.0 | 539700.0 |
| 1966 | 45100.0 | 44900.0 | 45200.0 | 44800.0 | 45600.0 | 46800.0 | 47200.0 | 47900.0 | 47500.0 | 48700.0 | 49300.0 | 48000.0 | 561000.0 |
| 1967 | 47600.0 | 47300.0 | 49100.0 | 48000.0 | 49200.0 | 49400.0 | 49900.0 | 49900.0 | 49200.0 | 48800.0 | 49000.0 | 47600.0 | 584000.0 |
| 1968 | 49600.0 | 49200.0 | 49700.0 | 49800.0 | 49900.0 | 50600.0 | 42500.0 | 51600.0 | 50400.0 | 50600.0 | 50600.0 | 50200.0 | 594700.0 |
| AVGE | 42225.0 | 42175.0 | 42550.0 | 41762.5 | 43187.5 | 44237.5 | 43837.5 | 45237.5 | 44737.5 | 44450.0 | 44650.0 | 43912.5 | |

TABLE TOTAL- 4193700.0 MEAN- 43580.2 STD. DEVIATION- 4623.9

# TABLE XVII

## ORIGINAL DATA

```
                  AUG 1970   TOTAL TRADE EMPLOYEES - ALBERTA                DBS CAT. NO. 72-508
B 1.  ORIGINAL SERIES
 YEAR      JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC               TOTAL
 1961   53800.0  53100.0  54800.0  55600.0  58200.0  58800.0  58700.0  59300.0  59400.0  59900.0  60200.0  61000.0           692800.0
 1962   57200.0  55900.0  57800.0  59300.0  60100.0  60900.0  60700.0  61400.0  61500.0  61200.0  61800.0  62600.0           720400.0
 1963   59900.0  58300.0  59200.0  59800.0  60300.0  61700.0  62100.0  62700.0  63400.0  63500.0  64000.0  65400.0           739300.0
 1964   61900.0  61700.0  61900.0  62400.0  63500.0  64200.0  64600.0  65000.0  65100.0  65100.0  65900.0  66600.0           767900.0
 1965   64000.0  64000.0  64100.0  66700.0  67500.0  68500.0  68800.0  69100.0  70200.0  70500.0  71400.0  72100.0           816900.0
 1966   69900.0  70100.0  71500.0  72300.0  73400.0  74700.0  74300.0  74800.0  74300.0  75000.0  76000.0  77400.0           883700.0
 1967   74500.0  73700.0  75000.0  75800.0  76100.0  78800.0  78100.0  77100.0  77500.0  78300.0  80100.0  80800.0           925800.0
 1968   77900.0  77600.0  78600.0  79500.0  80600.0  80900.0  81000.0  80000.0  80700.0  82400.0  84200.0  86100.0           969500.0

 AVGE   64762.5  64300.0  65362.5  66425.0  67462.5  68562.5  68537.5  68675.0  69012.5  69487.5  70450.0  71500.0
              TABLE TOTAL- 6516300.0             MEAN- 67878.1           STD. DEVIATION-  8254.0
```

```
                  AUG 1970   TRANSP., COMMUNICATION EMPLOYEES - ALBERTA     DBS CAT. NO. 72-508
B 1.  ORIGINAL SERIES
 YEAR      JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC               TOTAL
 1961   39600.0  39400.0  39900.0  41300.0  44700.0  45900.0  46700.0  46400.0  45900.0  45200.0  43300.0  41900.0           520200.0
 1962   41500.0  41000.0  41600.0  42400.0  44500.0  47400.0  48300.0  48200.0  47900.0  45600.0  44000.0  43000.0           535400.0
 1963   42400.0  42300.0  42400.0  42800.0  46800.0  48800.0  47900.0  48700.0  47500.0  46300.0  45900.0  44900.0           546700.0
 1964   45100.0  44900.0  44900.0  45100.0  47800.0  49000.0  49800.0  50300.0  49500.0  48000.0  47500.0  46100.0           568000.0
 1965   45900.0  46200.0  45800.0  45200.0  47700.0  49000.0  49800.0  50200.0  49000.0  48300.0  47500.0  47200.0           571800.0
 1966   46300.0  46500.0  46400.0  47200.0  48600.0  49600.0  50100.0  51200.0  50300.0  49100.0  48500.0  48200.0           582000.0
 1967   47800.0  47800.0  47900.0  47700.0  50100.0  51600.0  52800.0  52900.0  51200.0  49800.0  48600.0  47000.0           595200.0
 1968   46700.0  46400.0  46700.0  47100.0  50400.0  51100.0  50000.0  50900.0  50900.0  49600.0  49000.0  47700.0           586500.0

 AVGE   44412.5  44312.5  44450.0  44850.0  47575.0  49050.0  49425.0  49850.0  49025.0  47737.5  46787.5  45750.0
              TABLE TOTAL- 4505800.0             MEAN- 46935.4           STD. DEVIATION-  2962.2
```

# CHAPTER THREE

# THE INDIVIDUAL SERVICES OF ALBERTA COMPARED TO THE TOTAL SERVICES OF THE PROVINCE

In terms of seasonal volatility, the total services industry of Alberta has been found to have both the smallest range and the smallest standard deviation of the seasonal adjustment factors examined. The secular growth of the industry was also the largest of all sectors examined in the province. Thus, it would appear that the total services in Alberta could profitably be examined for its component services to see how they fare individually in comparison to their previously examined aggregate.

Direct comparability of data will be a problem in the Alberta services analysis. The primary reason for this is the fact that the Dominion Bureau of Statistics made a change in the DBS catalogue number 72-002 almost in the middle of the time period of analysis used here in the project, namely 1961 to 1968. It is unfortunate that DBS catalogue number 72-508 is not able to be used in this chapter, as it does not disaggregate the total services industry for Alberta. Therefore, instead of being able to obtain an estimate of both small and large firms, which the latter catalogue contains, DBS catalogue number 72-002 must be used which is a survey of large firms only employing 20 or more persons. Given the fact that a great many service establishments employ but few persons, the conclusions implied by the computer in the following analysis may have to be tempered with some intuitive economic reasoning.

A further problem arises from the time period chosen. Up to January of 1966, DBS catalogue number 72-002

contained only the two categories of total services, and hotels, restaurants and taverns for Alberta. This data was available in both raw figures, as well as an index number with the base year of 1949=100. Some problems also occurred as the DBS publication of January, 1966, was revised in three ways. Firstly, the 1960 Standard Industrial Classification was adopted. Secondly, the time base for all future publications was to become 1961=100, thus making data, from 1961 to 1965 incompatible with the data used in the rest of the probject. And thirdly, only as of January, 1966, were the categories of business services and personal services included for the province of Alberta.

However, the Dominion Bureau of Statistics did later publish a historical series classified as DBS catalogue number 72-504, which did attempt to make amends. The time base in this catalogue was set as 1961=100, and data was accordingly revised historically from January, 1961, through to May of 1965. Also extended back in time were the categories of business services and personal services, which had not been included for Alberta until 1966 in DBS catalogue number 72-002. However, the DBS did not see fit to include both types of data in the historical series, publishing index numbers only, at the expense of raw employment figures.

Therefore, in this analysis, personal services and business services will be published as index numbers, and hotels, restaurants and taverns as raw employment figures. This bias for raw employment figures is strictly personal,

as the Shiskin program handles index numbers and raw employment data with equal agility.

## SERVICE GROUPS

The first subgroup of total services examined is the business services group. This group encompasses Standard Industrial Classification categories 861 to 869. Included in this grouping are such establishments as accounting firms, advertising agencies, engineering and scientific services, as well as various other services offered to business management. This group also includes the various law practitioners including lawyers, barristers, solicitors, advocates and patent attorneys.

The second subgroup examined under the total services is the personal services group of Alberta. This group is subdivided into another category, namely that of hotels, restaurants and taverns. However, it should be noted here that because of the previously described difficulty of index numbers versus raw employment data, it is impossible to separate the later subgroup from the personal services for the time span of the project. Therefore, it must be kept in mind that when the personal services are discussed, also implicit in the discussion is the behavior of its largest subgroup, namely that of the hotels, restaurants and taverns.

The personal services group comprises SIC 871 to 879, SIC 875 being the hotels, restaurants and taverns subgroup. With the exception of SIC 875, personal services is comprised of shoe repair shops, barber and beauty shops, and

servants to private households, which includes cooks, maids, butlers and gardeners. Laundries and cleaners are also classified as a personal service, and these in turn include such diverse services as carpet cleaners, towel services, diaper services, fur cleaners and fur storage services. Funeral directors, lodging houses, private clubs, tailors, hunting and fishing guides and tourist guides are also considered a part of personal services.

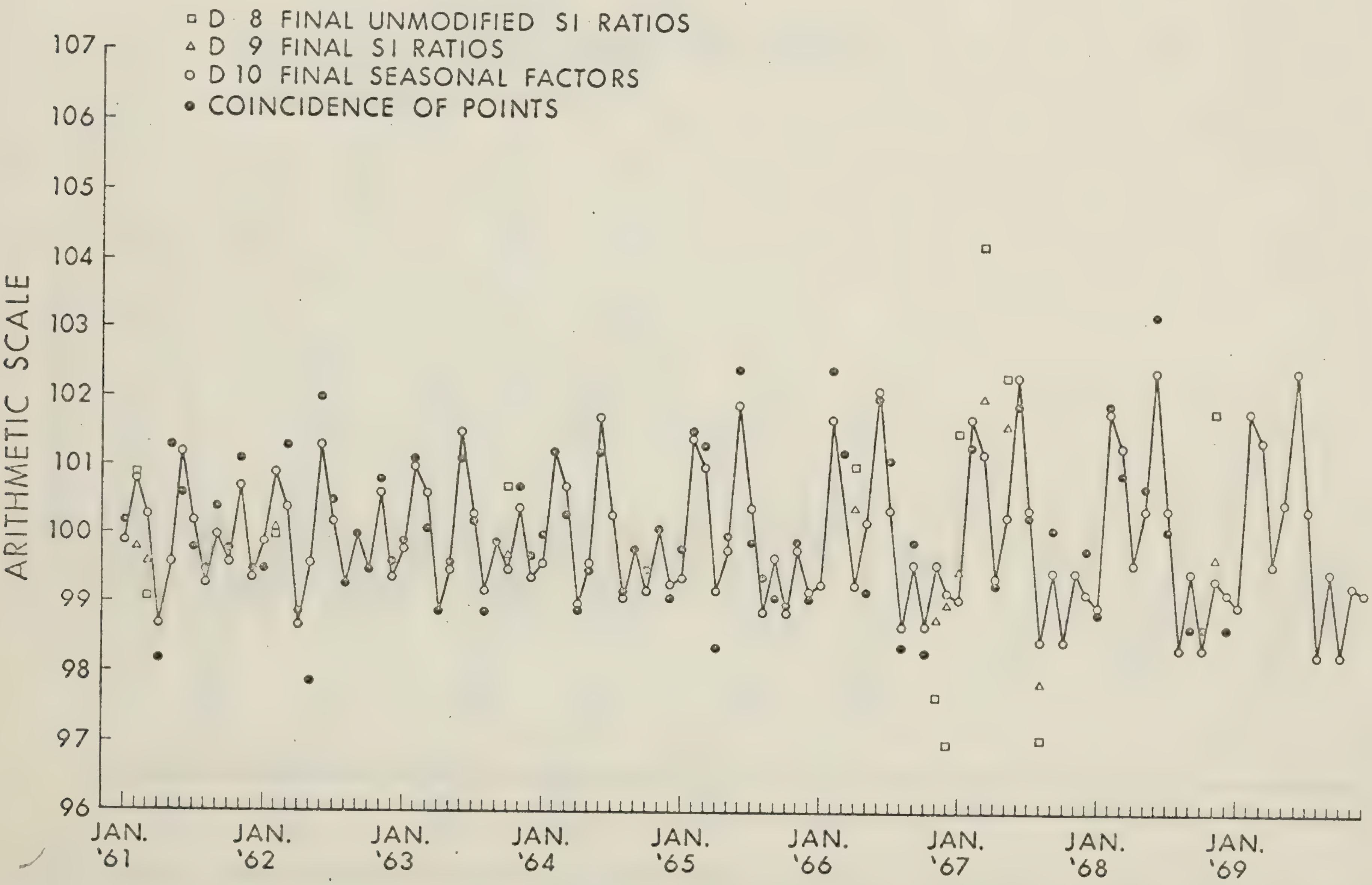
The major subgroup of personal services in Alberta, namely hotels, restaurants and taverns, are considered to be those establishments providing meals and/or lodgings on a seasonal or year-around basis. This comprises all cafes, restaurants, hotels, motels, tourist camps, cabin camps and services such as catering and banquet firms.

## SEASONAL SENSITIVITY

The seasonal adjustment factors for the three subgroups of the Alberta services do not behave at all as the adjustment factors for the total services. Glancing at their graphic print-outs (Charts XII - XV), two differences are immediately obvious to the eye: firstly, the magnitude between the crests and troughs of the individual services is much greater than that of the rather tightly knit total services. And secondly, it would appear that the individual services have a converging pattern of seasonal adjustment factors over time, as opposed to the diverging pattern exhibited by the total services.

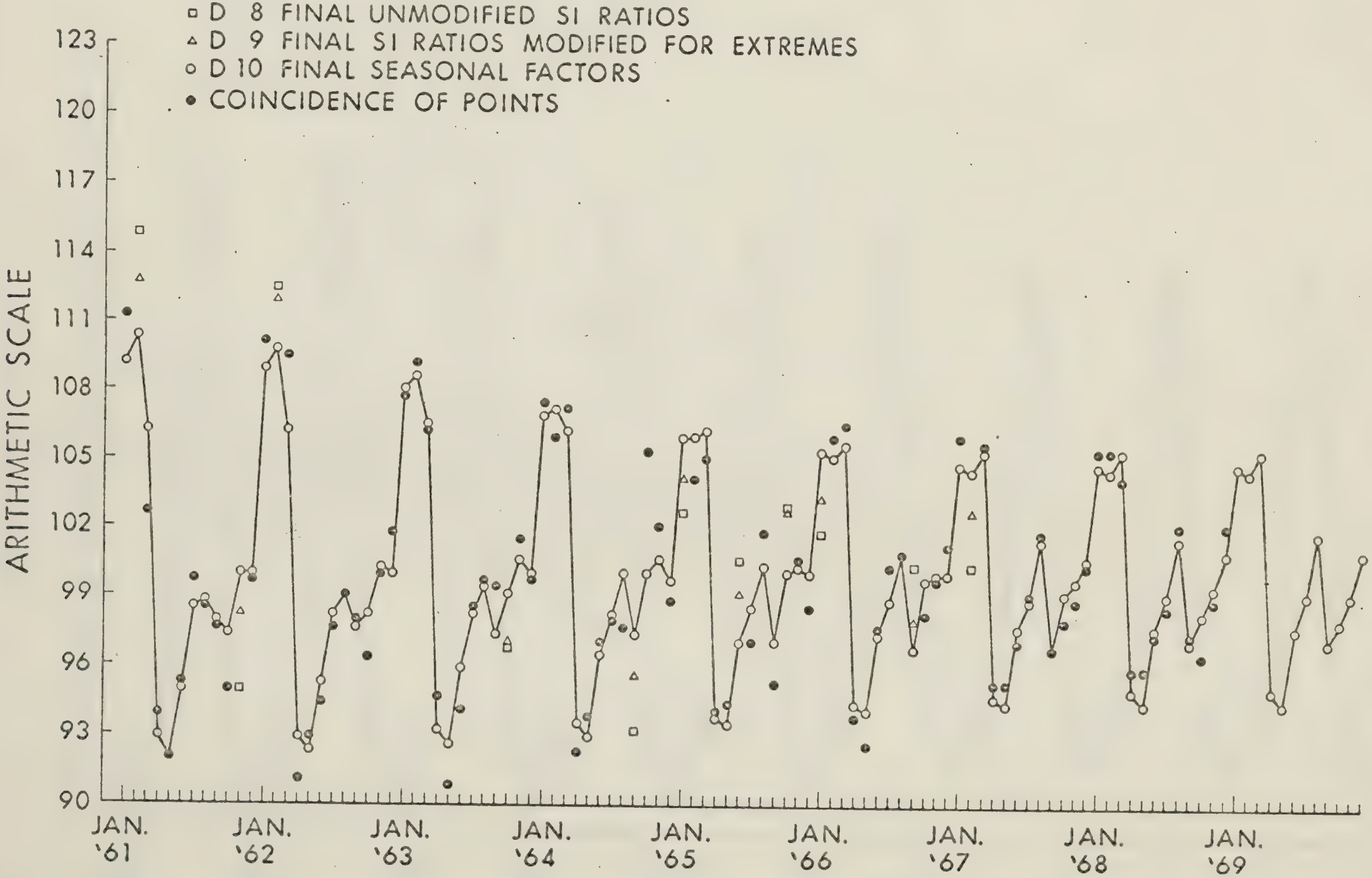
Again the importance of the seasonal element in

Chart XII



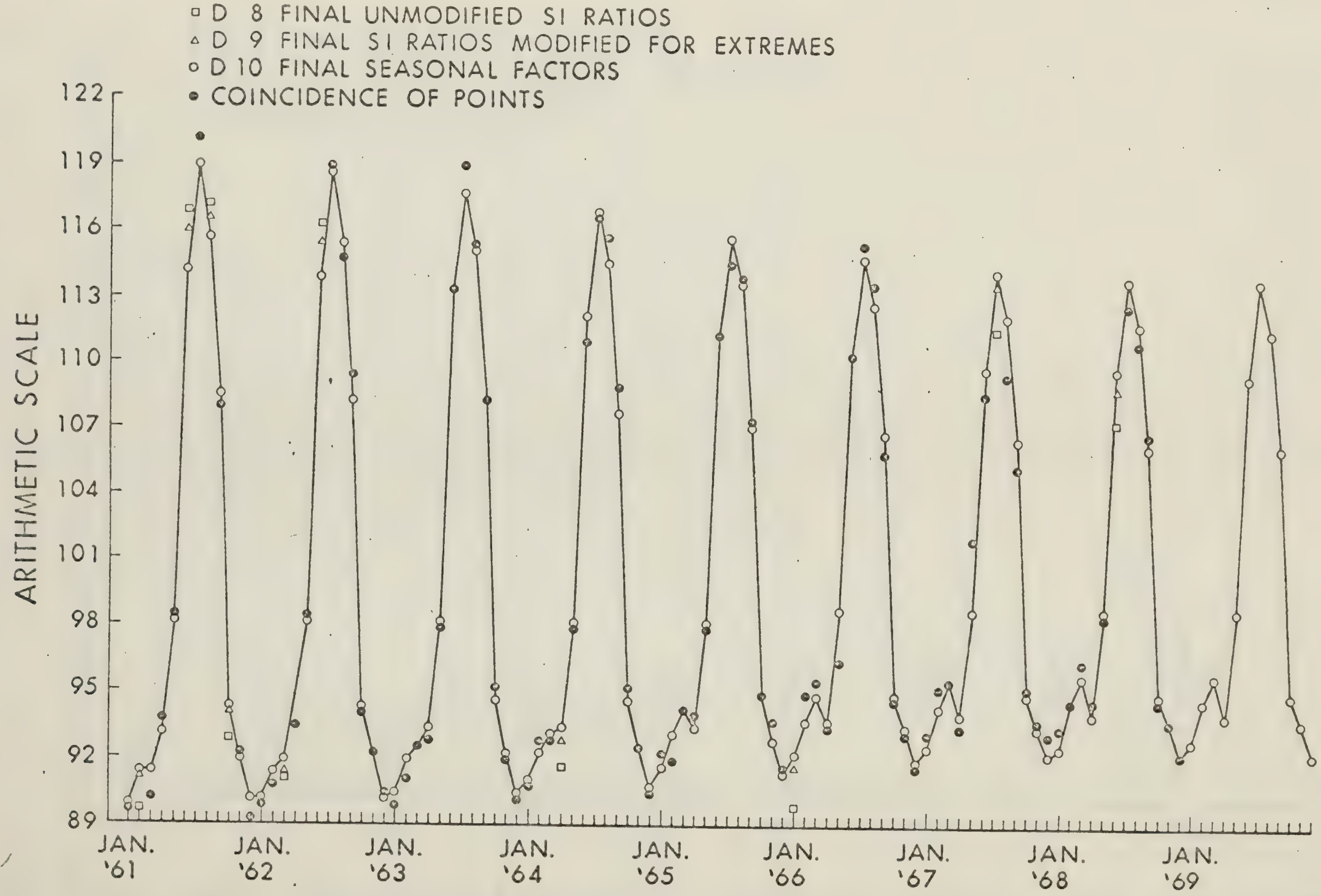
JULY 1970 TOTAL SERVICES EMPLOYEES - ALBERTA (ALL FIRMS) DBS CAT. No. 72-508

Chart XIII



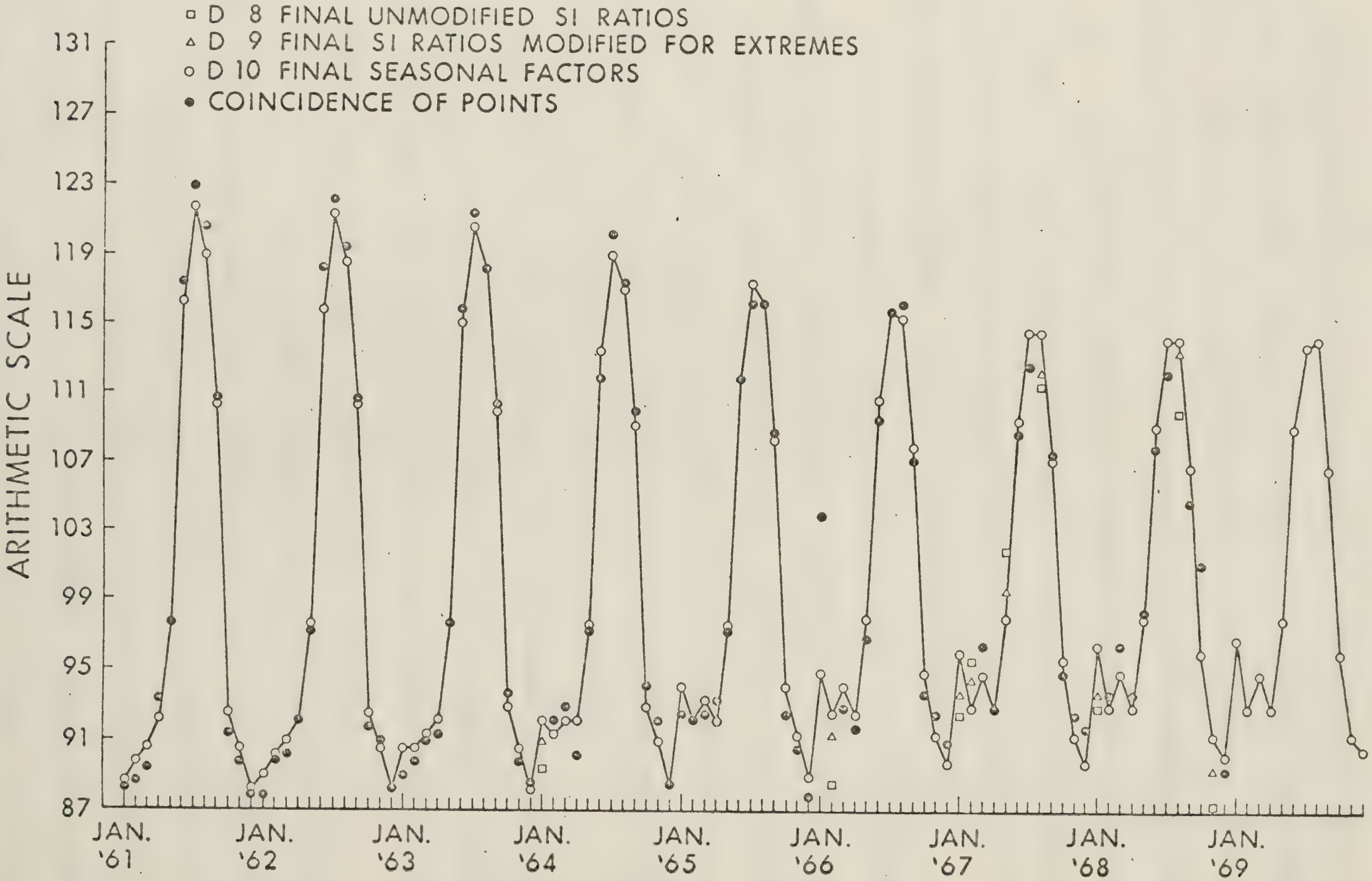
JULY 1970 EMPLOYMENT INDEXES BUSINESS SERVICES – ALBERTA DBS CAT. No. 72-002

Chart XIX



JULY 1970 EMPLOYMENT INDEXES PERSONAL SERVICES—ALBERTA DBS CAT. No. 72-002

Chart XV



JULY 1970 HOTEL, RESTAURANT EMPLOYEES – ALBERTA (20 + EMPL.) DBS CAT. No. 72-002

a time series is driven home. On a one-month basis, the seasonal factor is many times larger than that of the basic cyclical factor (Table XVIII). In fact, in some cases up to five times the size of the cyclical, as for example, in personal services and hotels, restaurants and taverns. Thus, the importance of removing the seasonal factor from the time series examined is once again emphasized.

Even at the six-month intervals the seasonal factor still dominates the cyclical movement in three out of four cases. However, at a span of 12 months duration, the cyclical factor dominates the seasonal in all four cases.

The need to remove the irregular factor to bring out the underlying cyclical factor is again seen by referring to the average monthly amplitude (Table XIV). In all four cases, the irregular factor dominates the cyclical. However, at six-month intervals, the cyclical factor rises above the irregular as it also does for the 12 month periods.

The distribution of the average values of the seasonal adjustment factors varies greatly from the total Alberta services as a whole (see Chart XIX). The total services have an average standard deviation of 1.0. However, the subgroups of the services are more widely dispersed. In fact, their lowest standard deviation is greater than the highest standard deviation found for all of the other industrial sectors of the Alberta economy examined in the previous chapter.

Business services have a standard deviation of 4.6.

## TABLE XVIII

### Average Monthly Amplitudes of Time Series Components*

| Series | Irregular (I) | | | Cyclical (C) | | | Seasonal (S) | | | Seasonally Adjusted (CI) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Span in Months | 1 | 6 | 12 | 1 | 6 | 12 | 1 | 6 | 12 | 1 | 6 | 12 |
| Total Service | .90 | .81 | .98 | .64 | 3.81 | 7.72 | 1.10 | 1.38 | .13 | 1.06 | 3.88 | 7.80 |
| Business Services | 1.91 | 1.84 | 1.86 | .94 | 5.72 | 11.78 | 2.85 | 6.55 | .38 | 2.19 | 6.15 | 11.85 |
| Personal Services | .94 | .97 | 1.00 | .74 | 3.94 | 7.48 | 4.31 | 14.59 | .37 | 1.22 | 4.30 | 7.63 |
| Hotels, Restaurants | 1.80 | 1.73 | 1.62 | .91 | 5.10 | 9.51 | 5.26 | 16.46 | .55 | 2.10 | 5.37 | 9.50 |

*Percentage change without regard to sign.

TABLE XIX

Final Seasonal Factors

| Series | Standard Deviation | Mean |
|---|---|---|
| Total Alberta Services | 1.0 | 100.0 |
| Business Services | 4.6 | 100.0 |
| Personal Services | 9.4 | 100.0 |
| Hotels, Restaurants | 10.8 | 100.0 |

But personal services and hotels, restaurants and taverns, have deviations of 9.4 and 10.8 respectively - a very wide dispersion, relatively speaking.

The range of the seasonal adjustment factors is also much greater in the individual services (Table XX). This varies from double that of the total services for the business services, to five and six times the magnitude for the personal services as a whole, thereby indicating greater seasonal volatility.

TABLE XX

Final Seasonal Factors

| Series | Range | | |
|---|---|---|---|
| | 1961 | 1969 | 1961-1969 |
| Total Alberta Services | 98.7-101.2 | 98.3-102.4 | 98.4-102.4 |
| Business Services | 92.1-110.7 | 94.6-105.5 | 92.1-110.7 |
| Personal Services | 89.9-119.3 | 92.4-114.2 | 89.9-119.3 |
| Hotels, Restaurants | 88.2-122.3 | 90.4-114.2 | 88.1-122.3 |

While total services reach their greatest seasonal factor value in June, business services do not do so until February or March (Table XXI). As a matter of fact, the crest

for the total services in June falls very close to the trough of the seasonal adjustment factor experienced by the business services in May.

TABLE XXI

Final Seasonal Factors

| Series | Approximate Month of | |
|---|---|---|
| | Trough | Crest |
| Total Alberta Services | Aug. - Oct. | June |
| Business Services | May | Feb. - Mar. |
| Personal Services | Nov. - Dec. | July |
| Hotels, Restaurants | Dec. | July |

Personal services and hotels, restaurants and taverns have a more conventional pattern, with highs experienced during the summer months and lows during mid-winter.

Considering the behavior of the seasonal adjustment factors over time for the individual services, it would appear that the behavior of the whole is at odds with that of its components (Table XXII). Namely, the seasonal adjustment factors appear to be diverging for the total services, while a converging pattern is observed for the individual services.

It is difficult to pinpoint the reason behind this apparent contradiction. Nevertheless, it is probably due to the nature of the data used. The total services were obtained from DBS catalogue number 72-508, which is a comprehensive survey of all establishments, large or small, in the services. The individual services were derived from DBS catalogue

# TABLE XXII

JULY 1970 EMPLOYMENT INDEXES BUSINESS SERVICES - ALBERTA DBS CAT. NO. 72-002 P. 6, SERIES ABSE1

*D11. FINAL SEASONALLY ADJUSTED SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 98861. | 100947. | 94022. | 98426. | 93055. | 99189. | 100597. | 98832. | 98925. | 96591. | 94434. | 100703. | 1179141. |
| 1962 | 102685. | 104473. | 105274. | 99424. | 101172. | 98431. | 97349. | 97213. | 96581. | 93544. | 94817. | 96727. | 1187737. |
| 1963 | 94427. | 94571. | 93598. | 95292. | 92117. | 92709. | 95395. | 96066. | 93181. | 94421. | 93069. | 97134. | 1142029. |
| 1964 | 98319. | 97125. | 99667. | 99166. | 100499. | 100923. | 100491. | 99921. | 99315. | 110934. | 107763. | 106525. | 1219659. |
| 1965 | 106066. | 109423. | 112372. | 116915. | 120504. | 126467. | 121834. | 126709. | 124153. | 131177. | 129633. | 129334. | 1455113. |
| 1966 | 129512. | 137789. | 140615. | 141522. | 143972. | 150515. | 157371. | 159130. | 169553. | 165152. | 170599. | 175513. | 1841244. |
| 1967 | 177663. | 170194. | 176909. | 180439. | 180324. | 173331. | 180208. | 180481. | 179400. | 178024. | 179582. | 182227. | 2146220. |
| 1968 | 185679. | 187454. | 185430. | 191116. | 192011. | 189138. | 187330. | 188568. | 187626. | 183512. | 185799. | 189348. | 2253577. |
| AVGE | 124152. | 125247. | 126230. | 127669. | 123643. | 129469. | 130134. | 130869. | 131717. | 131669. | 132604. | 134071. | |

TABLE TOTAL- 12424702. MEAN- 129424. STD. DEVIATION- 36500.

* Note: All data to be read 3 decimal places left of indicated decimal.

JULY 1970 EMPLOYMENT INDEXES PERSONAL SERVICES - ALBERTA DBS CAT. NO. 72-002 P. 6, SERIES APSE1

*D11. FINAL SEASONALLY ADJUSTED SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 96329. | 99674. | 97215. | 100341. | 101096. | 103928. | 102751. | 102878. | 100146. | 98368. | 99734. | 98722. | 1197380. |
| 1962 | 99032. | 98942. | 99057. | 100459. | 100793. | 102756. | 100765. | 99622. | 100994. | 99318. | 99542. | 99717. | 1200987. |
| 1963 | 98523. | 99487. | 99334. | 99001. | 100131. | 100771. | 102390. | 102050. | 102545. | 103952. | 103642. | 104549. | 1215373. |
| 1964 | 105533. | 106880. | 106509. | 105899. | 103794. | 109413. | 111845. | 114865. | 116026. | 116404. | 116270. | 116535. | 1334922. |
| 1965 | 113319. | 116311. | 118574. | 119621. | 118985. | 120203. | 119537. | 122384. | 123338. | 124713. | 127266. | 127910. | 1457157. |
| 1966 | 125218. | 131040. | 131612. | 131711. | 131135. | 136415. | 139456. | 141676. | 141812. | 144233. | 146395. | 148705. | 1649416. |
| 1967 | 152238. | 155290. | 155576. | 155926. | 161533. | 154291. | 152105. | 151985. | 154246. | 157697. | 158618. | 160759. | 1870272. |
| 1968 | 160590. | 159441. | 160337. | 159905. | 158639. | 156288. | 159022. | 161401. | 165243. | 165479. | 167211. | 167642. | 1941243. |
| AVGE | 119473. | 120283. | 121033. | 121607. | 122638. | 123008. | 123485. | 124608. | 125544. | 126270. | 127329. | 128069. | |

TABLE TOTAL- 11866723. MEAN- 123612. STD. DEVIATION- 23926.

* Note: All data to be read 3 decimal places left of indicated decimal.

JULY 1970 HOTEL,RESTAURANT EMPLOYEES - ALBERTA(20+ EMPL.)DBS CAT. NO. 72-002 P. 6, SERIES AHSE1

*D11. FINAL SEASONALLY ADJUSTED SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 64521. | 64939. | 66051. | 69031. | 69202. | 70735. | 71427. | 72340. | 71884. | 71169. | 71356. | 72372. | 835526. |
| 1962 | 72011. | 73465. | 73700. | 75200. | 75240. | 76857. | 75638. | 74942. | 74283. | 72813. | 73481. | 72823. | 890453. |
| 1963 | 71358. | 72084. | 72611. | 72769. | 74030. | 75237. | 75713. | 75873. | 76831. | 77947. | 76941. | 78819. | 900212. |
| 1964 | 76821. | 80424. | 80957. | 79273. | 81734. | 82057. | 85594. | 86527. | 88188. | 89239. | 89563. | 88156. | 1008438. |
| 1965 | 87268. | 89174. | 89147. | 92027. | 91281. | 92690. | 92326. | 93694. | 95194. | 95287. | 98144. | 98719. | 1114949. |
| 1966 | 111406. | 97913. | 101247. | 102108. | 102428. | 104028. | 107111. | 109839. | 109961. | 110844. | 115299. | 117337. | 1289519. |
| 1967 | 113003. | 123153. | 123025. | 121972. | 127117. | 120910. | 119424. | 118129. | 122208. | 121306. | 124234. | 125170. | 1459648. |
| 1968 | 118601. | 124524. | 126325. | 125644. | 125953. | 125223. | 126353. | 124796. | 129502. | 140479. | 128224. | 133361. | 1528981. |
| AVGE | 89374. | 90709. | 91620. | 92254. | 93373. | 93467. | 94198. | 94517. | 96006. | 97385. | 97218. | 98345. | |

TABLE TOTAL- 9027697. MEAN- 94039. STD. DEVIATION- 21283.

* Note: All data to be read 1 decimal places left of indicated decimal.

number 72-002 by way of necessity, which is a large firm survey covering only those establishments of 20 or more employed. Thus, all of the small firms are omitted from DBS catalogue number 72-002.

Economic research indicates that most service firms tend to be smaller establishments, usually owner-managed, with but few employees. It would appear then that a significant number of the establishments in the individual services have been omitted and this omission is having its effect on the displayed seasonal adjustment factors. This does, nevertheless, enable a distinction to be made between the behavior of large firms and all firms in the services in general. A larger firm with many employees would be more subject to seasonal fluctuations, or hirings and layoffs, which would make itself evident in a widely ranging seasonal adjustment factor. This is exactly what is happening in the graphical display of the adjustment factors using only data from DBS catalogue number 72-002.

However, the picture revealed is somewhat different when it comes to data also incorporating the smaller establishments, or firms employing fewer than 20 persons. It would appear not too preposterous to advance the preposition that a smaller firm would be less subject to seasonal variation because of its smaller resources of self-employed manpower. However, in the prosperity of the late 1960's, and with the new increases in the labor force being incorporated into the services, it is not wholly unrealistic to assume that some of

these workers were starting with newer firms which would be shoestring operations in terms of manpower and capital resources, and thus become more subject over time to the large seasonal variations experienced in the Canadian economy.

This is reflected in the visual presentation of the seasonal adjustment factors using total services data from DBS catalogue number 72-508. As the total services grow over time, more of the very small establishments come into the services, thus causing increasing pronounced seasonal swings.

The service figures in DBS catalogue 72-508 also include part-time workers. It is more realistic to assume that the part-time employees will be laid off or hired first, and since these are enumerated in DBS data, and not converted to full-time equivalents as in U.S. data, this could conceivably cause the increasingly greater seasonal volatility in the services as a whole.

This does not mean that the seasonal adjustment factors calculated from DBS catalogue number 72-002 should be discounted. Rather it would appear to suggest possible areas of policy to the provincial government to bring about some measure of stability in the services. The shift in the economy to the services tends to increase the importance of the small firm, and government policy should possibly be oriented towards their stable growth.

## CYCLICAL ANALYSIS

Again, one of the more interesting statistics provided in the summary measures of the Shiskin program is the

MCD. The MCD is the month in which the cyclical factor becomes greater than the irregular factor, or the month in which the I/C ratio falls below one.

Observing Table XXIII below, the month of cyclical dominance is generally found to fall on the second month for the sectors examined here, with the exception of the business services which has an MCD of 3. Thus, it can be concluded that in three out of four of the sectors in this chapter, cyclical movements, in other words, economically significant changes, are seen to occur every other month. For the business services, every third month must pass before the cyclical factor has become large enough to surpass the irregular factor. The MCD also provides some indication of the smoothness of the series. The lower the value of the MCD, the smoother the series, or the more the cyclical factor is found to dominate.

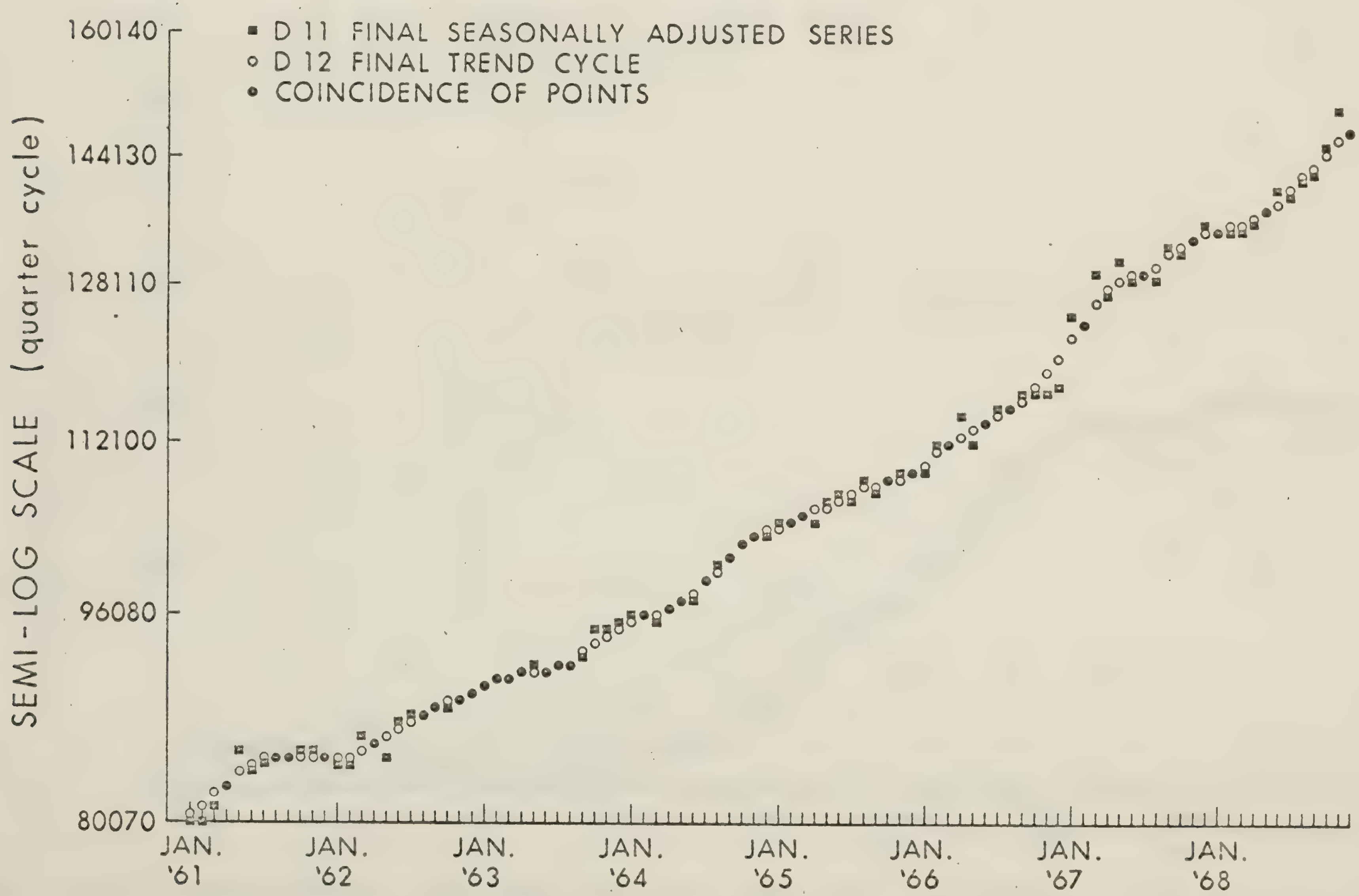
TABLE XXIII

Months for Cyclical Dominance

| Series | MCD |
|---|---|
| Total Alberta Services | 2 |
| Business Services | 3 |
| Personal Services | 2 |
| Hotels, Restaurants | 2 |

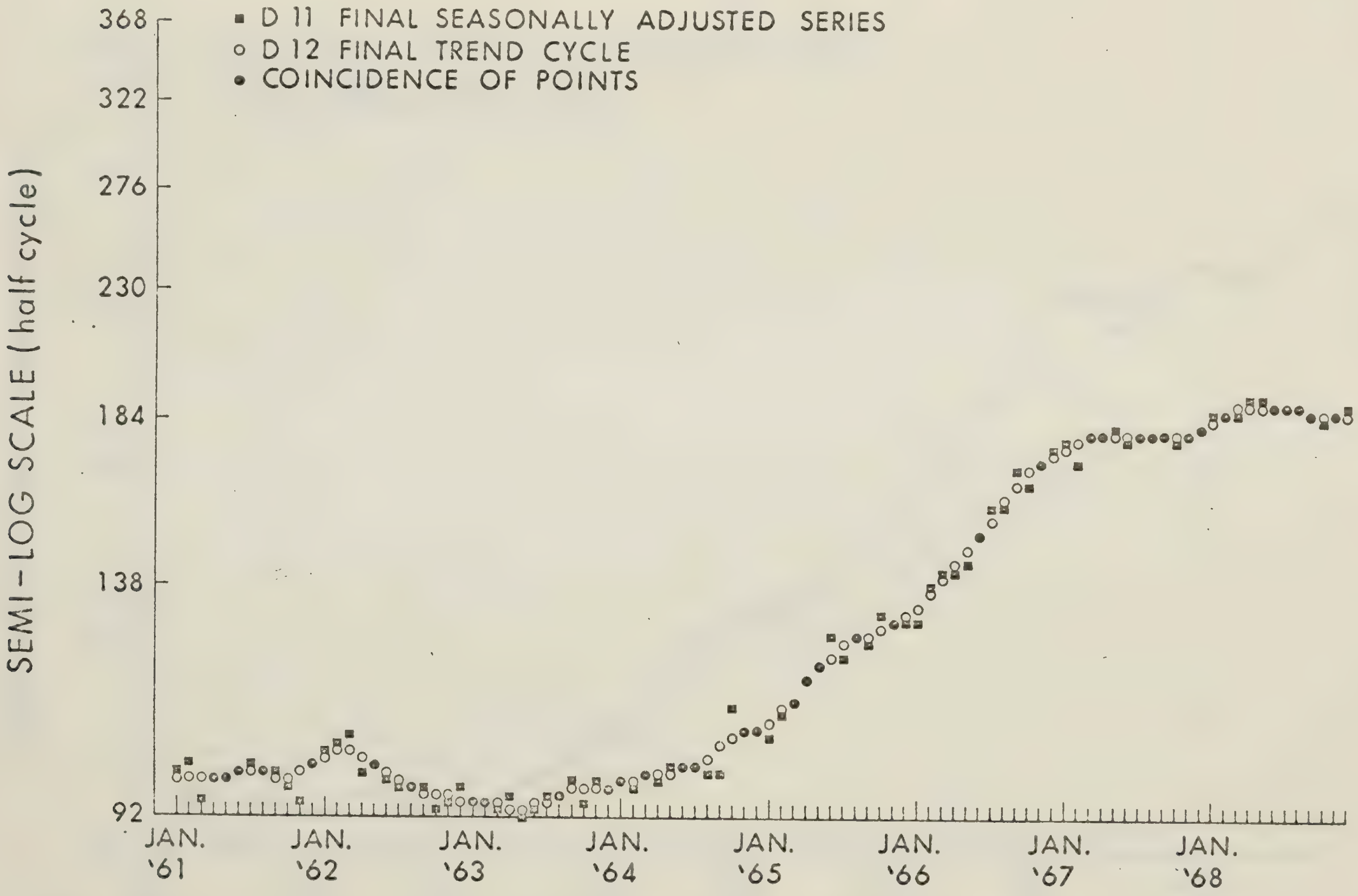
The growth of the secular factor over the years 1961 to 1968 is steeply positively sloped, as seen on the graphical print-outs for all the Alberta services (Charts XVI - IX and Table XXIV). The business services were observed

Chart XVI



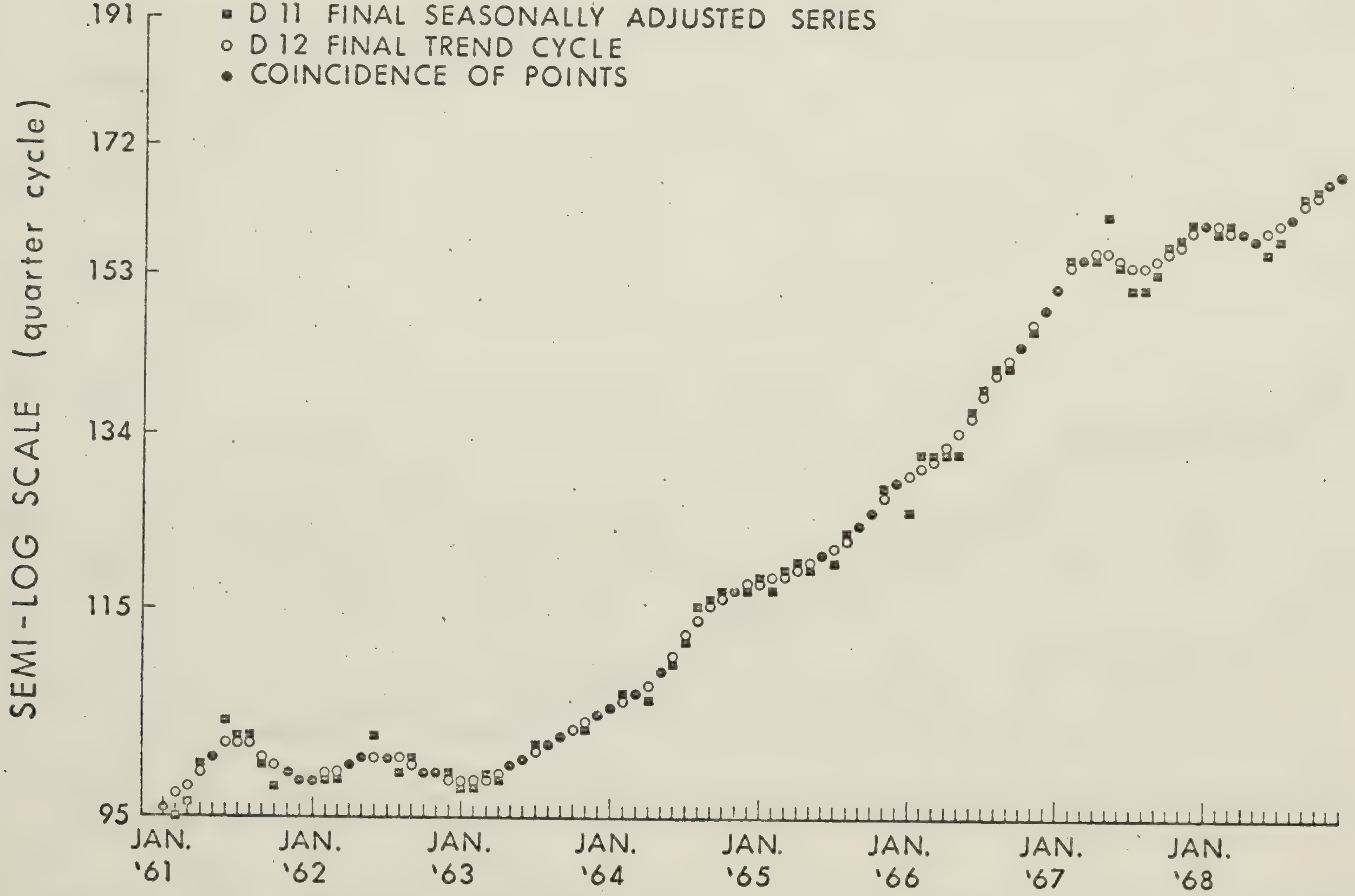
JULY 1970 TOTAL SERVICES EMPLOYEES - ALBERTA (ALL FIRMS) DBS CAT. No. 72-508

Chart XVII



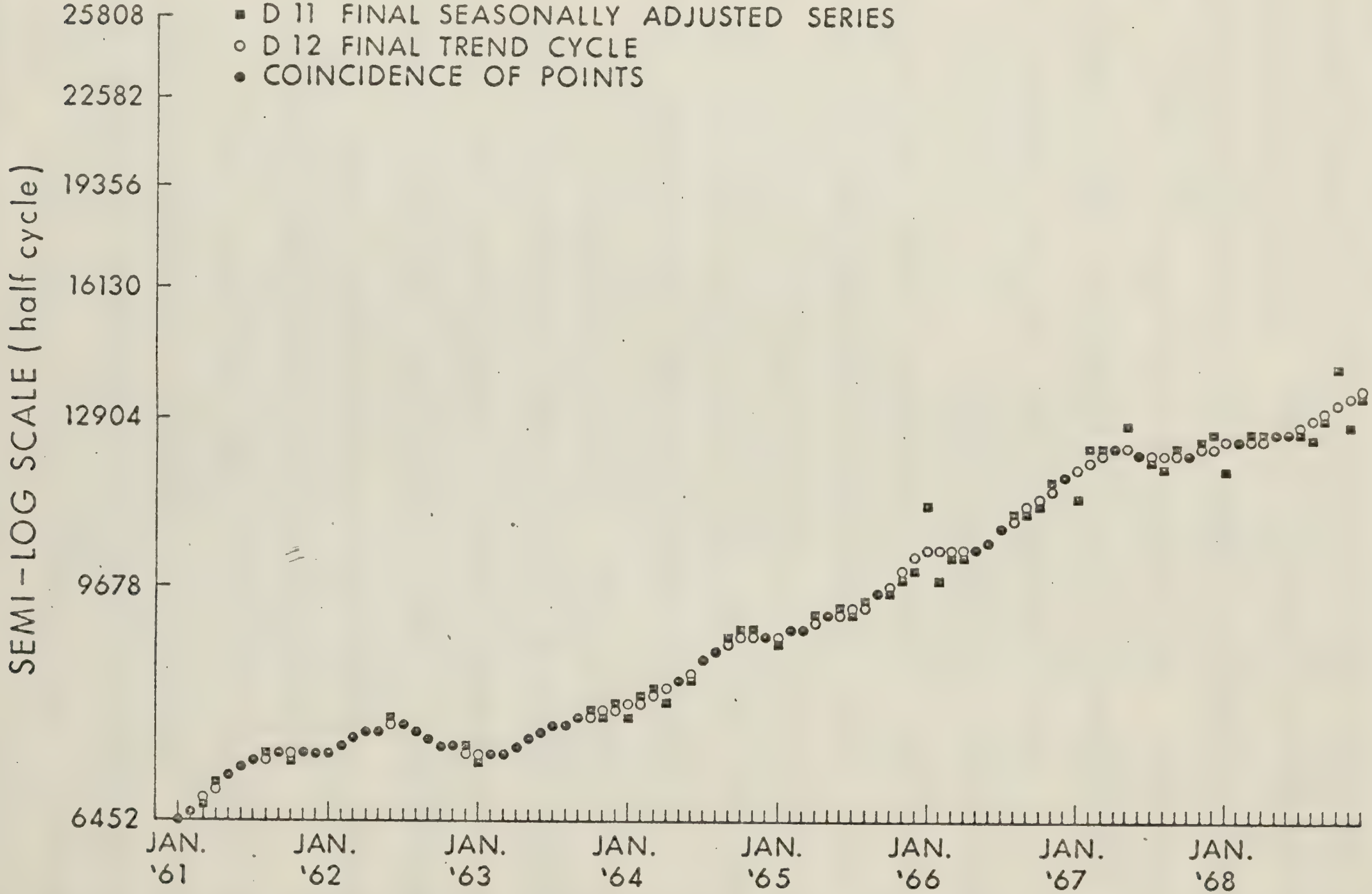
JULY 1970 EMPLOYMENT INDEXES BUSINESS SERVICES — ALBERTA DBS CAT. No. 72-002

Chart XVIII



JULY 1970 EMPLOYMENT INDEXES PERSONAL SERVICES—ALBERTA DBS CAT. No. 72-002

Chart XIX



JULY 1970. HOTEL, RESTAURANT EMPLOYEES – ALBERTA (20 +EMPL.) DBS CAT. No. 72-002

to take a slight decline in the early part of 1962, but recovered from a low of 93.68 in May of 1963, to achieve a peak employment peak index of 189.97 in May, 1968. On the whole, the seasonally adjusted data follows the cyclical factor quite closely, which is not altogether surprising, considering the demonstrated stability of the irregular factor.

The underlying cyclical factor of the personal services started much the same as the business services of Alberta, with a small dip in 1962. However, business services too experienced a period of rapid growth after this small decline, reaching a low of 96.44 in January of 1961, and a high employment index of 167.91 in December, 1968.

Hotels, restaurants and taverns which, it must be remembered, are the major component of personal services, also have experienced a positive growth pattern in their cyclical factor. The low of 6,464 employees in January, 1961, increased to 13,495 by December of 1968, which is roughly a doubling over an 8 year period.

Again published along with the graphical print-outs is the alternative cyclical pattern of the services series (Table XXV). This latter method utilizes a moving span average of duration equal to the MCD, and applying this to the seasonally adjusted series. Judicious use should be made of these two methods of achieving the cyclical factor as both are equally good methods of deriving the cyclical factor. It is seen that both are quite close in the values obtained.

Turning now to the average duration of run it is

# TABLE XXIV

JULY 1970 EMPLOYMENT INDEXES BUSINESS SERVICES - ALBERTA DBS CAT. NO. 72-002 P. 7, SERIES ABSE1
*D12. FINAL TREND CYCLE - HENDERSON CURVE
13-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 1.49

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 97544. | 97514. | 97572. | 97840. | 98320. | 98780. | 98935. | 98753. | 98426. | 98497. | 99259. | 100512. | 1181951. |
| 1962 | 101853. | 102729. | 102747. | 101960. | 100617. | 99075. | 97682. | 96631. | 95925. | 95425. | 95114. | 94981. | 1184740. |
| 1963 | 94781. | 94451. | 94039. | 93691. | 93681. | 94091. | 94771. | 95559. | 96289. | 96360. | 97220. | 97436. | 1142368. |
| 1964 | 97734. | 98214. | 98767. | 99129. | 99412. | 99996. | 101002. | 102405. | 103987. | 105471. | 106665. | 107632. | 1220465. |
| 1965 | 108905. | 110658. | 113209. | 116301. | 119399. | 121986. | 124027. | 125529. | 126699. | 127913. | 129465. | 131350. | 1455439. |
| 1966 | 133482. | 135952. | 138903. | 142424. | 146436. | 150765. | 155156. | 159663. | 163994. | 167765. | 170899. | 173581. | 1839066. |
| 1967 | 175320. | 177514. | 178663. | 179420. | 179826. | 179964. | 179763. | 179363. | 179238. | 179697. | 180714. | 182393. | 2152282. |
| 1968 | 184359. | 186528. | 188321. | 189510. | 189969. | 189659. | 188812. | 187785. | 186929. | 186491. | 186359. | 186563. | 2251281. |
| AVGE | 124310. | 125445. | 126524. | 127535. | 128464. | 129290. | 130019. | 130711. | 131436. | 132265. | 133212. | 134301. | |

TABLE TOTAL- 12428039. MEAN- 129459. STD. DEVIATION- 36414.

* Note: All data to be read 3 decimal places left of indicated decimal.

JULY 1970 EMPLOYMENT INDEXES PERSONAL SERVICES - ALBERTA DBS CAT. NO. 72-002 P. 7, SERIES APSE1
*D12. FINAL TREND CYCLE - HENDERSON CURVE
13-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 1.08

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 96442. | 97421. | 98586. | 99849. | 101080. | 101941. | 102190. | 101804. | 101019. | 100125. | 99408. | 98994. | 1198856. |
| 1962 | 98964. | 99272. | 99756. | 100275. | 100704. | 100904. | 100845. | 100595. | 100217. | 99813. | 99444. | 99141. | 1199929. |
| 1963 | 98914. | 98841. | 99031. | 99476. | 100108. | 100861. | 101603. | 102253. | 102857. | 103456. | 104070. | 104738. | 1216208. |
| 1964 | 105429. | 106095. | 106786. | 107673. | 108885. | 110418. | 112127. | 113811. | 115205. | 116144. | 116699. | 117028. | 1336298. |
| 1965 | 117345. | 117749. | 118223. | 118725. | 119254. | 119912. | 120833. | 122002. | 123365. | 124892. | 126454. | 127824. | 1456576. |
| 1966 | 128911. | 129815. | 130830. | 132148. | 133375. | 135946. | 138165. | 140381. | 142566. | 144738. | 146902. | 149303. | 1653576. |
| 1967 | 151917. | 154365. | 156141. | 156892. | 156663. | 155821. | 154985. | 154740. | 155302. | 156567. | 158174. | 159559. | 1871123. |
| 1968 | 160259. | 160307. | 159847. | 159319. | 159084. | 159402. | 160397. | 161902. | 163668. | 165316. | 166755. | 167910. | 1944162. |
| AVGE | 119773. | 120483. | 121150. | 121795. | 122457. | 123151. | 123893. | 124686. | 125525. | 126381. | 127238. | 128062. | |

TABLE TOTAL- 11876708. MEAN- 123716. STD. DEVIATION- 23937.

* Note: All data to be read 3 decimal places left of indicated decimal.

JULY 1970 HOTEL,RESTAURANT EMPLOYEES - ALBERTA(20+ EMPL.)DBS CAT. NO. 72-002 P. 7, SERIES AHSE1
*D12. FINAL TREND CYCLE - HENDERSON CURVE
13-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 1.67

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 64643. | 65605. | 66781. | 68060. | 69400. | 70528. | 71314. | 71704. | 71825. | 71839. | 71908. | 72116. | 835724. |
| 1962 | 72577. | 73286. | 74129. | 74936. | 75519. | 75739. | 75565. | 75057. | 74343. | 73573. | 72898. | 72401. | 890022. |
| 1963 | 72154. | 72195. | 72544. | 73139. | 73930. | 74780. | 75569. | 76222. | 76759. | 77270. | 77797. | 78355. | 900714. |
| 1964 | 78873. | 79367. | 79933. | 80700. | 81759. | 83169. | 84860. | 86512. | 87814. | 88504. | 88684. | 88657. | 1008833. |
| 1965 | 88728. | 89098. | 89748. | 90606. | 91480. | 92262. | 92783. | 93525. | 94904. | 96895. | 99143. | 101135. | 1120306. |
| 1966 | 102446. | 102926. | 102394. | 102880. | 103303. | 104451. | 106345. | 108504. | 110406. | 112277. | 114162. | 116148. | 1286741. |
| 1967 | 118235. | 120176. | 121526. | 122096. | 121968. | 121397. | 120889. | 120798. | 121189. | 121828. | 122552. | 123239. | 1455892. |
| 1968 | 123788. | 124243. | 124695. | 125017. | 125517. | 126466. | 127828. | 129541. | 131406. | 132953. | 134127. | 134948. | 1540526. |
| AVGE | 90181. | 90862. | 91531. | 92179. | 92859. | 93599. | 94394. | 95233. | 96081. | 96892. | 97659. | 98375. | |

TABLE TOTAL- 9038724. MEAN- 94153. STD. DEVIATION- 21296.

* Note: All data to be read 1 decimal places left of indicated decimal.

# TABLE XXV

JULY 1970 EMPLOYMENT INDEXES BUSINESS SERVICES - ALBERTA DBS CAT. NO. 72-002 P.15, SERIES ABSE1

*F 1. MCD MOVING AVERAGE

MCD IS 3

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | ******* | 97943. | 97798. | 96834. | 98557. | 99280. | 99539. | 99451. | 98116. | 96670. | 97076. | 99127. | 1080412. |
| 1962 | 102454. | 104144. | 103057. | 101957. | 99692. | 99001. | 97681. | 97047. | 95779. | 94980. | 95029. | 95323. | 1186144. |
| 1963 | 95241. | 94198. | 94487. | 93669. | 93373. | 93407. | 94723. | 96547. | 96223. | 96890. | 96558. | 97857. | 1143174. |
| 1964 | 97543. | 98370. | 98320. | 99441. | 99860. | 100634. | 100446. | 99909. | 103391. | 106011. | 108414. | 106791. | 1219128. |
| 1965 | 107338. | 109287. | 112903. | 116597. | 121295. | 122935. | 125003. | 124234. | 127348. | 128341. | 130223. | 129668. | 1455168. |
| 1966 | 132368. | 135972. | 139975. | 142036. | 145336. | 150619. | 155674. | 162020. | 164614. | 168435. | 170421. | 174593. | 1842061. |
| 1967 | 174458. | 175557. | 176497. | 180041. | 179881. | 179788. | 179673. | 180030. | 179302. | 179002. | 179943. | 182495. | 2146663. |
| 1968 | 185119. | 186204. | 188017. | 189536. | 190755. | 189660. | 188519. | 188015. | 186575. | 185646. | 186220. | ******* | 2064261. |
| AVGE | 127789. | 125210. | 126382. | 127514. | 128594. | 129415. | 130157. | 130907. | 131418. | 131997. | 132988. | 126551. | |

TABLE TOTAL- 12136983.

* Note: All data to be read 3 decimal places left of indicated decimal.

JULY 1970 EMPLOYMENT INDEXES PERSONAL SERVICES - ALBERTA DBS CAT. NO. 72-002 P.15, SERIES APSE1

*F 1. MCD MOVING AVERAGE

MCD IS 2

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | ******* | 96101. | 96544. | 98778. | 100719. | 102512. | 103339. | 102814. | 101512. | 99257. | 99051. | 99228. | 1099855. |
| 1962 | 98877. | 98987. | 99000. | 99753. | 100622. | 101775. | 101760. | 100193. | 100308. | 100156. | 99430. | 99630. | 1200491. |
| 1963 | 99120. | 98505. | 93910. | 99167. | 99566. | 100451. | 101580. | 102220. | 102297. | 103249. | 103797. | 104096. | 1212057. |
| 1964 | 105041. | 106207. | 106695. | 106204. | 107346. | 109104. | 110629. | 113355. | 115445. | 116215. | 116312. | 116377. | 1329628. |
| 1965 | 117427. | 117315. | 117442. | 119197. | 119303. | 119594. | 119870. | 120960. | 122861. | 124025. | 125989. | 127598. | 1451470. |
| 1966 | 126564. | 128129. | 131326. | 131661. | 131423. | 133775. | 137940. | 140571. | 141744. | 143022. | 145314. | 147550. | 1639017. |
| 1967 | 150472. | 153764. | 155433. | 155751. | 158729. | 157912. | 153198. | 152045. | 153116. | 155972. | 158158. | 159694. | 1854239. |
| 1968 | 160679. | 160016. | 159914. | 160146. | 159272. | 157463. | 157655. | 160211. | 163322. | 165361. | 166345. | 167426. | 1937806. |
| AVGE | 122597. | 119878. | 120658. | 121320. | 122122. | 122823. | 123246. | 124046. | 125076. | 125907. | 126799. | 127699. | |

TABLE TOTAL- 11734734.

* Note: All data to be read 3 decimal places left of indicated decimal.

JULY 1970 HOTEL,RESTAURANT EMPLOYEES - ALBERTA(20+ EMPL.)DBS CAT. NO. 72-002 P.15, SERIES AHSE1

*F 1. MCD MOVING AVERAGE

MCD IS 2

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | ******* | 64730. | 65495. | 67541. | 69117. | 69968. | 71081. | 71883. | 72112. | 71527. | 71512. | 72114. | 767080. |
| 1962 | 72192. | 72738. | 73582. | 74450. | 75220. | 76049. | 76247. | 75290. | 74612. | 73548. | 73147. | 73152. | 890228. |
| 1963 | 72091. | 71721. | 72347. | 72690. | 73400. | 74634. | 75475. | 75793. | 76352. | 77389. | 77444. | 77880. | 897214. |
| 1964 | 77820. | 78623. | 80640. | 80067. | 80506. | 81896. | 83826. | 86060. | 87358. | 88714. | 89401. | 88860. | 1003769. |
| 1965 | 87712. | 88221. | 89161. | 90587. | 91654. | 91985. | 92508. | 93010. | 94444. | 95240. | 96716. | 98432. | 1109667. |
| 1966 | 105063. | 104659. | 99580. | 101678. | 102268. | 103228. | 105569. | 108475. | 109900. | 110402. | 113072. | 116318. | 1280211. |
| 1967 | 115170. | 118078. | 123089. | 122499. | 124545. | 124013. | 120167. | 118776. | 120168. | 121757. | 122770. | 124702. | 1455732. |
| 1968 | 121885. | 121562. | 125425. | 125985. | 125799. | 125588. | 125788. | 125575. | 127149. | 134990. | 134351. | 130792. | 1524887. |
| AVGE | 93133. | 90042. | 91165. | 91937. | 92813. | 93420. | 93833. | 94358. | 95262. | 96696. | 97302. | 97781. | |

TABLE TOTAL- 8928755.

* Note: All data to be read 1 decimal places left of indicated decimal.

recalled that for a random series of 120 observations, the average run is between 1.36 and 1.75, 95% of the time (Table XXVI). Thus, from the information in this table, the irregular factor can be considered to be essentially random in nature.

TABLE XXVI

Average Duration of Run

| Series | Irregular (I) | Seasonally Adjusted (CI) | Moving Average (Period-MCD) |
|---|---|---|---|
| Total Alberta Services | 1.51 | 1.94 | 4.95 |
| Business Services | 1.61 | 1.79 | 2.74 |
| Personal Services | 1.51 | 2.26 | 3.76 |
| Hotels, Restaurants | 1.44 | 2.21 | 3.36 |

For the seasonally adjusted data, not one of the series falls within the specified range for randomness. However, this is undoubtedly due to the fact that the irregular factor (I) is large enough to dominate the monthly movements in the seasonally adjusted series (CI).

The moving average of a random series has an expected average run of 2.0, regardless of the period of the MCD moving average. In Table XXVI above, the values are 2.74, 3.36, 3.76 and 4.95. All can reasonably be considered outside the bounds of randomness by Shiskin's standards, so that they can be taken to represent correctly the cyclical movements of the series. Again, the original data series is contained in the following Table XXVII at the conclusion of the chapter.

# TABLE XXVII

JULY 1970 EMPLOYMENT INDEXES BUSINESS SERVICES - ALBERTA DBS CAT. NO. 72-002 P. 1, SERIES ABSF1

*B 1. ORIGINAL SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 103300. | 111700. | 100100. | 91600. | 90300. | 94200. | 99200. | 97800. | 96900. | 94200. | 94800. | 100400. | 1177560. |
| 1962 | 112100. | 115000. | 112100. | 92600. | 93400. | 93900. | 95900. | 96400. | 94400. | 92000. | 95300. | 96300. | 1189900. |
| 1963 | 102200. | 103100. | 99900. | 88800. | 85300. | 88900. | 93900. | 95600. | 95600. | 93900. | 93900. | 97300. | 1143600. |
| 1964 | 105200. | 104400. | 106200. | 91800. | 93400. | 97400. | 99000. | 100000. | 96700. | 111000. | 108700. | 106500. | 1220300. |
| 1965 | 112500. | 116200. | 119600. | 109800. | 112700. | 122800. | 120200. | 127400. | 120600. | 131600. | 130500. | 129900. | 1453900. |
| 1966 | 136600. | 145000. | 148900. | 133700. | 135500. | 146900. | 155500. | 161000. | 164500. | 165100. | 171000. | 176100. | 1839800. |
| 1967 | 186700. | 178400. | 188300. | 171000. | 170900. | 174400. | 178500. | 183300. | 174100. | 176600. | 179200. | 183600. | 2145500. |
| 1968 | 194900. | 196400. | 195700. | 181500. | 181600. | 184900. | 186400. | 192000. | 182400. | 180700. | 184900. | 191200. | 2252600. |
| AVGE | 132313. | 133775. | 133913. | 120100. | 120388. | 125425. | 128588. | 131681. | 128175. | 130638. | 132913. | 135225. | |

TABLE TOTAL- 12425100. MEAN- 129428. STD. DEVIATION- 36682.

* Note: All data to be read 3 decimal places left of indicated decimal.

JULY 1970 EMPLOYMENT INDEXES PERSONAL SERVICES - ALBERTA DBS CAT. NO. 72-002 P. 1, SERIES APSF1

*B 1. ORIGINAL SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 86600. | 87500. | 89000. | 93600. | 99400. | 119100. | 122600. | 119200. | 108900. | 93000. | 91900. | 88900. | 1199700. |
| 1962 | 89300. | 90500. | 91000. | 93800. | 99100. | 117400. | 119800. | 115300. | 109700. | 93900. | 91800. | 89900. | 1201500. |
| 1963 | 89200. | 90500. | 91900. | 92500. | 98300. | 114400. | 121000. | 117800. | 111200. | 98400. | 95800. | 94600. | 1215600. |
| 1964 | 96000. | 98300. | 99400. | 99000. | 106900. | 123100. | 131100. | 131800. | 125200. | 110300. | 107700. | 105900. | 1335200. |
| 1965 | 108400. | 108500. | 111800. | 112000. | 117100. | 133900. | 133800. | 139400. | 132500. | 113300. | 118300. | 116800. | 1455800. |
| 1966 | 115500. | 123100. | 125100. | 123600. | 129500. | 150800. | 160600. | 160200. | 151700. | 137000. | 136700. | 136600. | 1650400. |
| 1967 | 140900. | 146500. | 148600. | 146500. | 159700. | 169800. | 174200. | 170900. | 164600. | 149800. | 148500. | 148200. | 1868200. |
| 1968 | 148900. | 150800. | 153600. | 150300. | 157000. | 171700. | 181800. | 180900. | 176000. | 157200. | 156700. | 154800. | 1939700. |
| AVGE | 109350. | 112025. | 113800. | 113913. | 120375. | 137525. | 143738. | 141938. | 134975. | 119738. | 118425. | 116963. | |

TABLE TOTAL- 11866100. MEAN- 123605. STD. DEVIATION- 26476.

* Note: All data to be read 3 decimal places left of indicated decimal.

JULY 1970 HOTEL,RESTAURANT EMPLOYEES - ALBERTA(20+ EMPL.)DBS CAT. NO. 72-002 P. 1, SERIES AHSF1

*B 1. ORIGINAL SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 57240. | 58420. | 59870. | 63540. | 67580. | 82600. | 87340. | 86430. | 79570. | 65890. | 64960. | 63850. | 837290. |
| 1962 | 64190. | 66330. | 67040. | 69270. | 73500. | 89390. | 92140. | 89270. | 82060. | 67420. | 66460. | 64190. | 891260. |
| 1963 | 64620. | 65400. | 66420. | 66980. | 72280. | 86720. | 91550. | 89930. | 84580. | 72350. | 69810. | 69630. | 900280. |
| 1964 | 70810. | 73400. | 74570. | 73010. | 79870. | 93420. | 102250. | 101710. | 96550. | 83110. | 81480. | 78180. | 1008360. |
| 1965 | 82050. | 82070. | 83180. | 84870. | 89340. | 103940. | 108730. | 109170. | 103490. | 89600. | 89550. | 88000. | 1113990. |
| 1966 | 106010. | 90740. | 95420. | 94580. | 100520. | 115290. | 124420. | 127000. | 118820. | 105280. | 105400. | 105200. | 1288680. |
| 1967 | 108500. | 114490. | 116640. | 113300. | 124900. | 132930. | 137370. | 135900. | 131290. | 116270. | 113590. | 112650. | 1457830. |
| 1968 | 114590. | 115870. | 120040. | 116870. | 123960. | 137240. | 144670. | 143230. | 138760. | 135120. | 117260. | 120390. | 1527900. |
| AVGE | 83503. | 83340. | 85398. | 85303. | 91481. | 105191. | 111059. | 110330. | 104390. | 91880. | 88564. | 87761. | |

TABLE TOTAL- 9025590. MEAN- 94017. STD. DEVIATION- 23352.

* Note: All data to be read 1 decimal places left of indicated decimal.

# CHAPTER FOUR

# THE INDIVIDUAL SERVICE INDUSTRIES OF CANADA

The previous chapter examined the individual sectors of the services in Alberta as closely as permitted by the available data. In this chapter, the aggregated services for Canada as a whole will be examined so that it will be possible in the following chapter to draw comparisons between Alberta's individual services and those of Canada. In so doing, some light should be shed on one of the postulates advanced in the introductory chapter as to which services should be actively promoted by the provincial government for their growth potential. Such a service would preferably be relatively stable seasonally, and enjoy sustained growth.

Again in this analysis, there is the unavoidable dichotomy in sources of data. The total services for Canada will be drawn from DBS catalogue number 72-508, and will be presented in raw employment figures. This services category is composed of community, business and personal services comprising SIC 850 to 899.

Personal services must be drawn from DBS catalogue number 72-002 for the reasons previously outlined in chapter three. Therefore, the employment data must be presented as index numbers by way of necessity. Again, the personal services comprise SIC 871 to 879. The largest subgroup of the personal services is the hotels, restaurants and taverns group. For the sake of data uniformity, employment figures for this group were obtained from DBS catalogue number 72-002. However, it must be kept in mind that this catalogue is a large firm survey only, compiling only establishments of 20

or more employees. The procedure undoubtedly leaves out a majority of smaller operations. Yet the choice is to make do with the only data available, or to ignore these sectors altogether. The data presented for SIC 875 are raw employment figures.

Business services for Canada are also examined for seasonal and cyclical characteristics. The data for 1961 through 1968 is obtained from DBS catalogue number 72-002 and is presented in terms of index numbers. Business services comprise all the categories included in SIC 861 to 869.

The only category not to have made an appearance before in this project is SIC 851 to 859, or the recreational services. This group is not tabulated in DBS catalogue number 72-508, but is included in DBS catalogue number 72-002 for Canada only, the province of Alberta not being covered. However, it should be possible to obtain some idea of how the recreational services would fare in Alberta from studying the national picture.

The employment data for the recreational services is presented as index numbers. What do these services include? Basically, they encompass any type of establishment providing amusement, entertainment or recreation on an admission basis. This includes motion picture theatres, drive-ins, live theatre companies, dance bands, entertainers, film exchanges and motion picture producers. Bowling alleys, dancehalls, athletic clubs, stadiums, ski-tows, commercial beaches and commercial swimming pools are also included.

Boat rentals, golf courses, horse racing tracks, riding academies, skating rinks and amusement parks are also considered an integral part of recreational services.

SEASONAL SENSITIVITY

Is it possible that the aggregated services for Canada as a whole might not be plagued by a large seasonal factor in the original or unadjusted series? Observing the one-month span columns in the monthly amplitude (Table XXVIII), it is seen that the seasonal factor does dominate the cyclical factor by a healthy margin in most series. Only at the six-month intervals does the cyclical factor begin to assert itself. The cyclical factor is larger than the seasonal at this point for total services and for the business services. It is not until the twelve-month intervals occur that the cyclical factor dominates the seasonal in all of the series examined.

The irregular factor does not fare as well against the cyclical factor. Even at a one-month time span, the cyclical factor dominates the irregular for the total services series, as well as for the recreational services. By the six-month interval, the cyclical factor dominates the irregular factor in all five series. Thus, it is once again demonstrated that the seasonal and irregular factors can cloud the true picture presented by a time series, if these two factors are not discounted.

The Canadian series examined here present a unique series of final seasonal adjustment factors, as is evidenced

## TABLE XXVIII

### Average Monthly Amplitudes of Time Series Components*

| | Irregular (I) | | | Cyclical (C) | | | Seasonal (S) | | | Seasonally Adjusted (CI) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Span in Months | 1 | 6 | 12 | 1 | 6 | 12 | 1 | 6 | 12 | 1 | 6 | 12 |
| Total Services-Canada | .54 | .57 | .55 | .60 | 3.37 | 6.72 | .77 | .92 | .09 | .81 | 3.47 | 6.83 |
| Business Services | .84 | .76 | .86 | .66 | 3.95 | 8.26 | 1.23 | 3.63 | .10 | 1.08 | 4.05 | 8.29 |
| Personal Services | .25 | .22 | .23 | .47 | 2.71 | 5.60 | 1.77 | 7.00 | .08 | .55 | 2.74 | 5.58 |
| Hotels, Restaurants | .51 | .46 | .51 | .72 | 4.07 | 8.03 | 2.08 | 7.95 | .13 | .85 | 4.11 | 8.07 |
| Recreational Services | 1.42 | 1.44 | 1.59 | .59 | 2.93 | 5.54 | 4.29 | 16.15 | .25 | 1.60 | 3.40 | 5.58 |

*Percentage change without regard to sign.

by the graphical print-outs (Charts XX - XXIX). The Canadian aggregated services have seasonal adjustment factors with the lowest standard deviation yet encountered in this project (Table XXIX). The total services of Canada have a standard deviation of only .9. The only series to have a seasonal adjustment factor approaching this value is the total services for the province of Alberta with a standard deviation of 1.0.

One of the highest standard deviations obtained for a seasonal adjustment factor to date is that of the recreational services for Canada. These services had a standard deviation of 9.1 for the years 1961 to 1968. This is only lower than the Alberta personal services and its subgroup, hotels, restaurants and taverns.

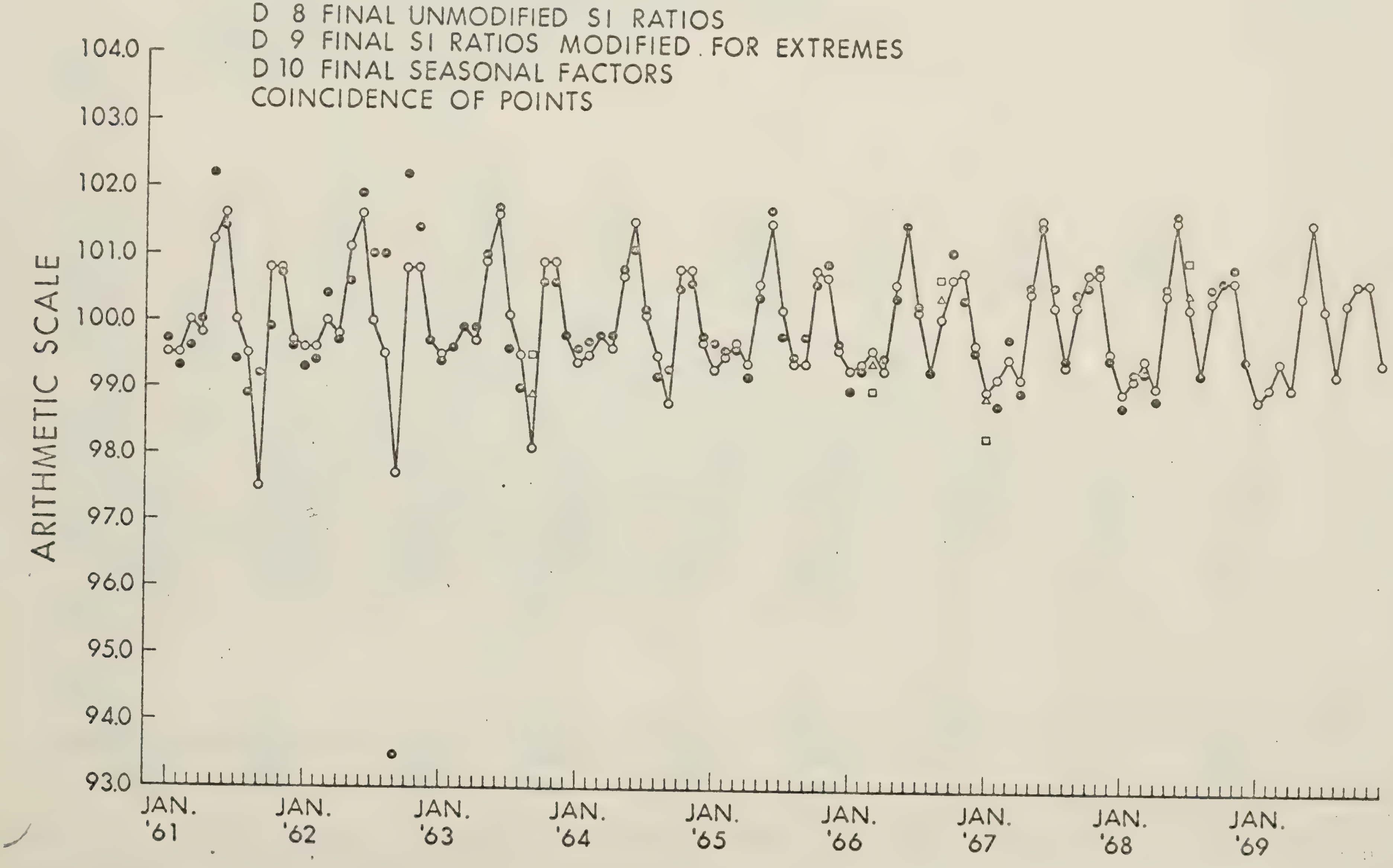
TABLE XXIX

Final Seasonal Factors - Canada

| Series | Standard Deviation | Mean |
|---|---|---|
| Total Services-Canada | .9 | 100.0 |
| Business Services | 2.1 | 100.0 |
| Personal Services | 4.0 | 100.0 |
| Hotels, Restaurants | 4.5 | 100.0 |
| Recreational Services | 9.1 | 100.0 |

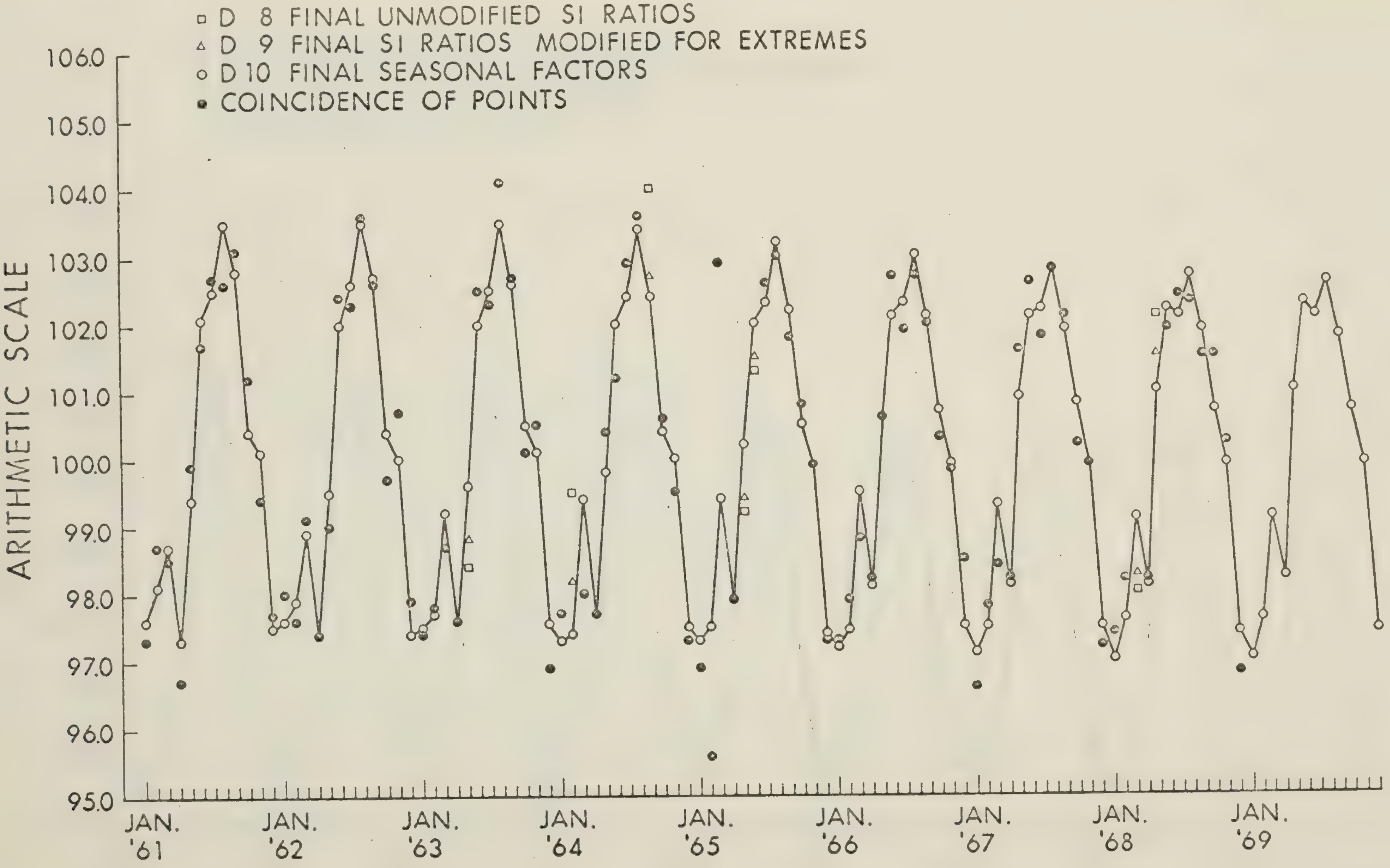
It is interesting to note that the value of the standard deviation of the business services for Canada is about half that of the comparable service for the province of Alberta. Business services for Canada have a standard deviation of 2.1, while those for Alberta have a standard deviation of 4.6.

Chart XX



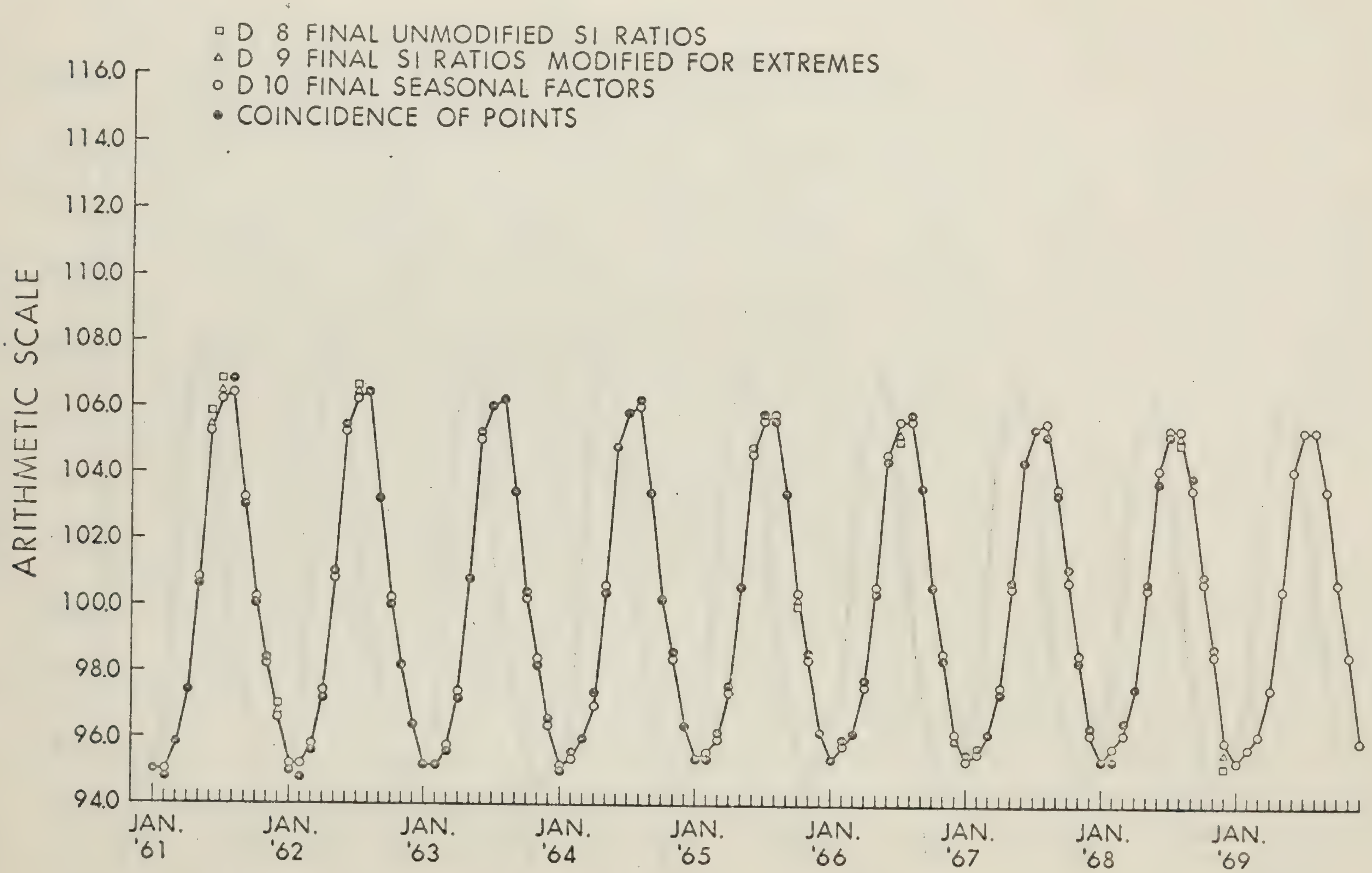
JULY 1970 TOTAL SERVICES EMPLOYEES - CANADA (ALL FIRMS) DBS CAT. No. 72-508

Chart XXI



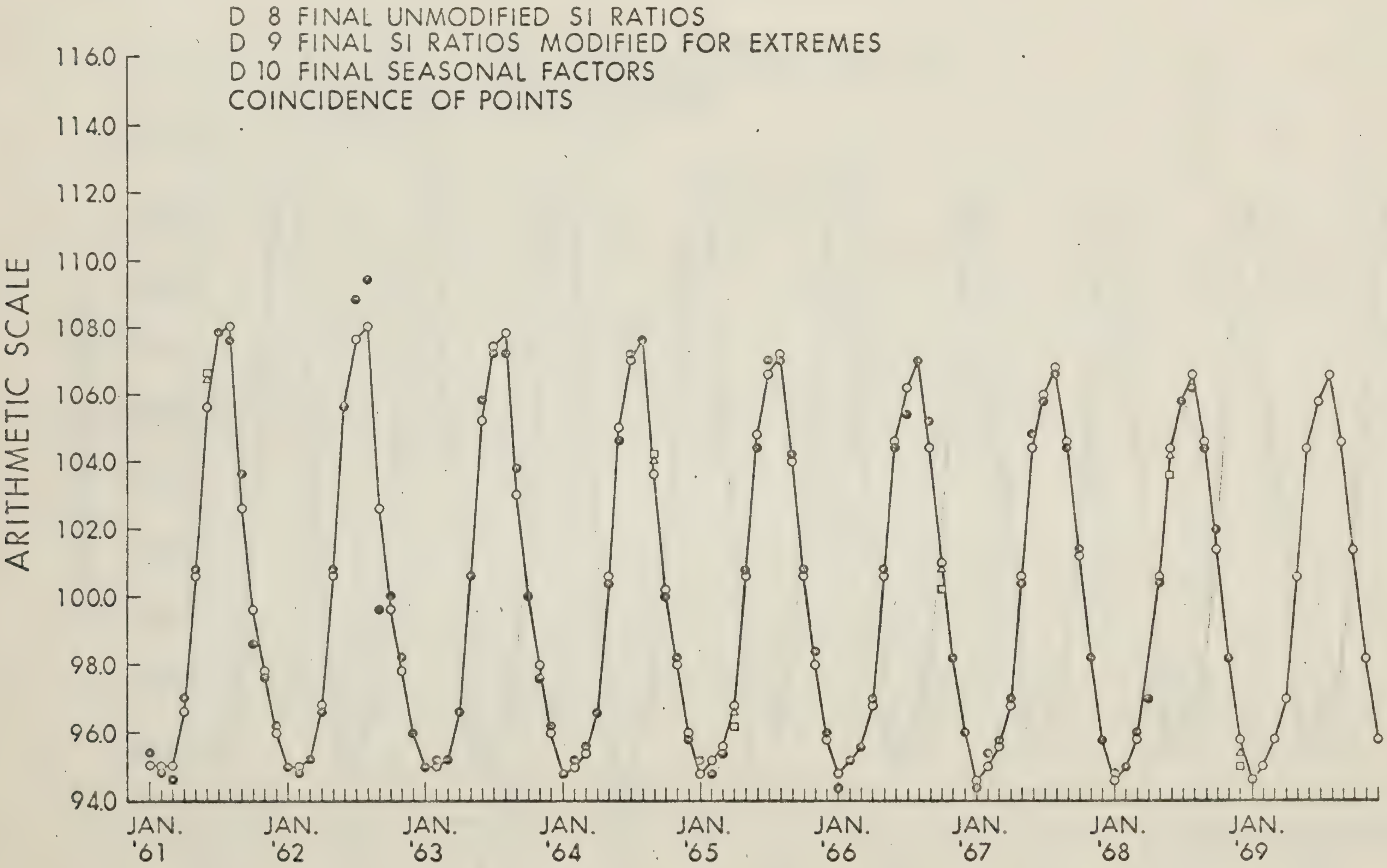
JULY 1970 EMPLOYMENT INDEXES BUSINESS SERVICES - CANADA DBS CAT. No. 72-002

Chart XXII



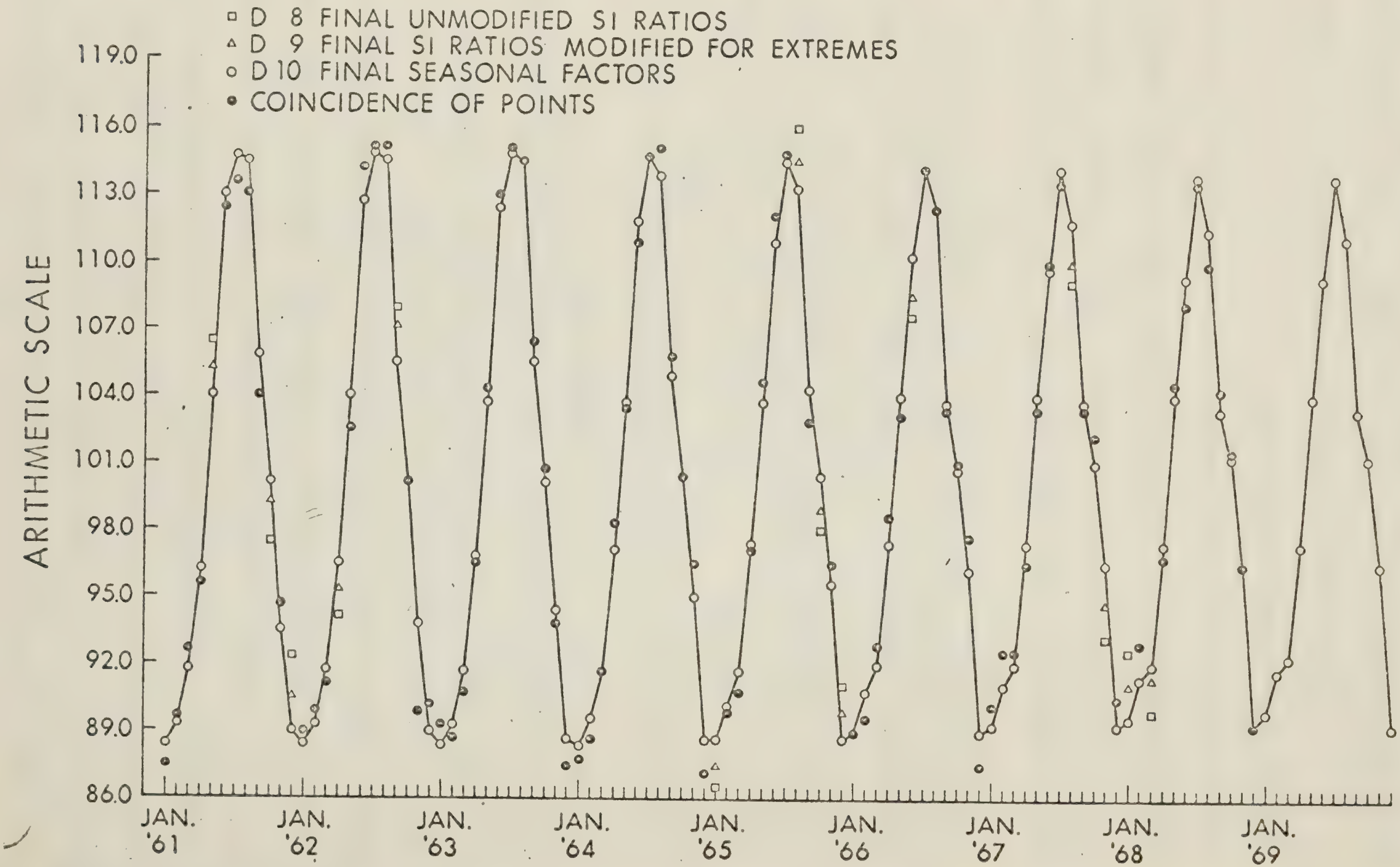
JULY 1970 EMPLOYMENT INDEXES PERSONAL SERVICES-CANADA DBS CAT. No. 72-002

Chart XXIII



JULY 1970 HOTEL, RESTAURANT EMPLOYEES - CANADA (20+ EMPL.) DBS CAT. No. 72-002

Chart XXIV



JULY 1970 EMPLOYMENT INDEXES RECREATIONAL SERVICES - CANADA DBS CAT. No. 72-002

The same situation is revealed for the personal services of Canada. The standard deviation of the personal services is 4.0, while that of its largest subgroup, hotels, restaurants and taverns is 4.5. The values for the comparable industries in Alberta are 9.4 and 10.8 respectively.

The seasonal adjustment factors for the total services of Canada present a converging pattern over time (Table XXX). The range is the smallest of the series presented here, being projected to 98.9 to 101.6 in 1969. Again in this series, it is observed that the trough appears to be increasing over the time span while the crest remains fairly constant.

TABLE XXX

Final Seasonal Factors

| Series | Range | | |
|---|---|---|---|
| | 1961 | 1969 | 1961-1969 |
| Total Services-Canada | 97.5-101.6 | 98.9-101.6 | 97.5-101.6 |
| Business Services | 97.3-103.5 | 97.0-102.6 | 97.0-103.5 |
| Personal Services | 95.0-106.4 | 95.5-105.4 | 95.0-106.4 |
| Hotels, Restaurants | 94.9-108.0 | 94.6-106.6 | 94.6-108.0 |
| Recreational Services | 88.5-114.7 | 89.3-114.0 | 88.5-114.8 |

(The season factors are displayed in Tables XXXI - XXXII.)

The business services have a larger range with a value expected in 1969 of 97.0 to 102.6. The seasonal adjustment factors would appear to be decreasing over time as in the total services series.

The range of the personal services for Canada was expected to be 95.5 to 105.4 in 1969. The range of the largest subgroup in the personal services, namely, hotels,

# TABLE XXXI

JULY 1970 TOTAL SERVICES EMPLOYEES - CANADA (ALL FIRMS) DBS CAT. NO. 72-508 P. 5, SERIES CTSE2

D10. FINAL SEASONAL FACTORS

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 99.5 | 99.5 | 100.0 | 99.8 | 101.2 | 101.6 | 100.0 | 99.5 | 97.5 | 100.8 | 100.8 | 99.7 | 100.0 |
| 1962 | 99.6 | 99.6 | 100.0 | 99.8 | 101.1 | 101.6 | 100.0 | 99.5 | 97.7 | 100.8 | 100.8 | 99.7 | 100.0 |
| 1963 | 99.5 | 99.6 | 99.9 | 99.7 | 100.9 | 101.6 | 100.1 | 99.5 | 98.1 | 100.9 | 100.9 | 99.8 | 100.0 |
| 1964 | 99.4 | 99.5 | 99.8 | 99.6 | 100.7 | 101.5 | 100.1 | 99.5 | 98.8 | 100.8 | 100.8 | 99.7 | 100.0 |
| 1965 | 99.3 | 99.5 | 99.7 | 99.4 | 100.6 | 101.5 | 100.2 | 99.4 | 99.4 | 100.8 | 100.7 | 99.6 | 100.0 |
| 1966 | 99.3 | 99.4 | 99.6 | 99.3 | 100.6 | 101.5 | 100.2 | 99.3 | 100.1 | 100.7 | 100.8 | 99.7 | 100.0 |
| 1967 | 99.0 | 99.2 | 99.5 | 99.2 | 100.5 | 101.6 | 100.3 | 99.4 | 100.3 | 100.8 | 100.8 | 99.6 | 100.0 |
| 1968 | 99.0 | 99.2 | 99.5 | 99.1 | 100.5 | 101.6 | 100.3 | 99.3 | 100.4 | 100.7 | 100.7 | 99.5 | 100.0 |

TABLE TOTAL- 9601.0 MEAN- 100.0 STD. DEVIATION- 0.9

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1969 | 98.9 | 99.1 | 99.5 | 99.1 | 100.5 | 101.6 | 100.3 | 99.3 | 100.4 | 100.7 | 100.7 | 99.5 | 100.0 |

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JULY 1970 EMPLOYMENT INDEXES BUSINESS SERVICES - CANADA DBS CAT. NO. 72-002 P. 5, SERIES CBSE1

D10. FINAL SEASONAL FACTORS

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 97.6 | 98.1 | 98.7 | 97.3 | 99.4 | 102.1 | 102.5 | 103.5 | 102.8 | 100.4 | 100.1 | 9[illegible].5 | 100.0 |
| 1962 | 97.6 | 97.9 | 98.9 | 97.4 | 99.5 | 102.0 | 102.6 | 103.5 | 102.7 | 100.4 | 100.0 | 9[illegible].4 | 100.0 |
| 1963 | 97.5 | 97.7 | 99.2 | 97.6 | 99.6 | 102.0 | 102.5 | 103.5 | 102.6 | 100.5 | 100.1 | 9[illegible].5 | 100.0 |
| 1964 | 97.3 | 97.4 | 99.4 | 97.7 | 99.8 | 102.0 | 102.4 | 103.4 | 102.4 | 100.4 | 100.0 | 9[illegible].5 | 100.0 |
| 1965 | 97.3 | 97.5 | 99.4 | 97.9 | 100.2 | 102.0 | 102.3 | 103.2 | 102.2 | 100.5 | 99.9 | 9[illegible].4 | 100.0 |
| 1966 | 97.2 | 97.5 | 99.5 | 98.1 | 100.6 | 102.1 | 102.3 | 103.0 | 102.1 | 100.7 | 99.9 | 9[illegible].5 | 100.0 |
| 1967 | 97.1 | 97.5 | 99.3 | 98.1 | 100.9 | 102.1 | 102.2 | 102.8 | 101.9 | 100.8 | 99.9 | 9[illegible].5 | 100.0 |
| 1968 | 97.0 | 97.6 | 99.1 | 98.1 | 101.0 | 102.2 | 102.1 | 102.7 | 101.9 | 100.7 | 99.9 | 9[illegible].4 | 100.0 |

TABLE TOTAL- 9599.4 MEAN- 100.0 STD. DEVIATION- 2.1

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1969 | 97.0 | 97.6 | 99.1 | 98.2 | 101.0 | 102.3 | 102.1 | 102.6 | 101.8 | 100.7 | 99.9 | 9[illegible].4 | 100.0 |

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JULY 1970 EMPLOYMENT INDEXES PERSONAL SERVICES - CANADA DBS CAT. NO. 72-002 P. 5, SERIES CPSF1

D10. FINAL SEASONAL FACTORS

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 95.1 | 95.0 | 95.7 | 97.3 | 100.8 | 105.2 | 106.2 | 106.4 | 103.2 | 100.1 | 98.3 | 9[illegible].5 | 100.0 |
| 1962 | 95.1 | 95.1 | 95.8 | 97.4 | 100.7 | 105.2 | 106.2 | 106.3 | 103.2 | 100.1 | 98.3 | 9[illegible].5 | 100.0 |
| 1963 | 95.2 | 95.3 | 95.9 | 97.4 | 100.7 | 105.1 | 106.1 | 106.2 | 103.3 | 100.2 | 98.4 | 9[illegible].5 | 100.0 |
| 1964 | 95.2 | 95.4 | 95.9 | 97.4 | 100.6 | 104.9 | 105.9 | 106.0 | 103.4 | 100.3 | 98.4 | 9[illegible].4 | 100.0 |
| 1965 | 95.3 | 95.6 | 96.1 | 97.5 | 100.6 | 104.7 | 105.7 | 105.8 | 103.4 | 100.4 | 98.4 | 9[illegible].2 | 100.0 |
| 1966 | 95.4 | 95.7 | 96.2 | 97.6 | 100.6 | 104.5 | 105.5 | 105.6 | 103.6 | 100.7 | 98.5 | 9[illegible].2 | 100.0 |
| 1967 | 95.4 | 95.7 | 96.3 | 97.6 | 100.6 | 104.3 | 105.4 | 105.5 | 103.6 | 100.8 | 98.6 | 9[illegible].1 | 100.0 |
| 1968 | 95.4 | 95.7 | 96.3 | 97.6 | 100.7 | 104.3 | 105.4 | 105.4 | 103.6 | 100.8 | 98.5 | 9[illegible].1 | 100.0 |

TABLE TOTAL- 9599.2 MEAN- 100.0 STD. DEVIATION- 4.0

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1969 | 95.5 | 95.7 | 96.3 | 97.6 | 100.7 | 104.2 | 105.3 | 105.4 | 103.6 | 100.9 | 98.5 | 9[illegible].0 | 100.0 |

# TABLE XXXII

JULY 1970 HOTEL,RESTAURANT EMPLOYEES - CANADA (20+ EMPL.)DBS CAT. NO. 72-002 P. 5, SERIES CHSE1

D10. FINAL SEASONAL FACTORS

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 95.0 | 94.9 | 95.1 | 96.7 | 100.7 | 105.7 | 107.8 | 108.0 | 102.5 | 99.6 | 97.8 | 9[illegible].0 | 100.0 |
| 1962 | 95.1 | 95.0 | 95.2 | 96.7 | 100.7 | 105.6 | 107.7 | 107.9 | 102.7 | 99.7 | 97.9 | 9[illegible].0 | 100.0 |
| 1963 | 95.0 | 95.0 | 95.3 | 96.7 | 100.7 | 105.3 | 107.4 | 107.8 | 103.0 | 100.0 | 98.0 | 9[illegible].1 | 100.0 |
| 1964 | 94.9 | 95.0 | 95.4 | 96.7 | 100.6 | 105.0 | 107.0 | 107.5 | 103.5 | 100.3 | 98.1 | 9[illegible].0 | 100.0 |
| 1965 | 94.8 | 95.1 | 95.0 | 96.8 | 100.6 | 104.8 | 106.6 | 107.2 | 104.0 | 100.6 | 98.1 | 9[illegible].9 | 100.0 |
| 1966 | 94.8 | 95.2 | 95.7 | 96.9 | 100.6 | 104.6 | 106.3 | 106.9 | 104.4 | 101.0 | 98.2 | 9[illegible].9 | 100.0 |
| 1967 | 94.6 | 95.1 | 95.7 | 96.9 | 100.6 | 104.5 | 106.0 | 106.8 | 104.6 | 101.2 | 98.3 | 9[illegible].8 | 100.0 |
| 1968 | 94.6 | 95.1 | 95.7 | 96.9 | 100.6 | 104.4 | 105.9 | 106.7 | 104.6 | 101.3 | 98.2 | 9[illegible].8 | 100.0 |

TABLE TOTAL- 9600.5 MEAN- 100.0 STD. DEVIATION- 4.5

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1969 | 94.6 | 95.1 | 95.7 | 97.0 | 100.6 | 104.4 | 105.8 | 106.6 | 104.6 | 101.4 | 98.2 | 9[illegible].7 | 100.0 |

JULY 1970 EMPLOYMENT INDEXES RECREATIONAL SERVICES - CAN.DBS CAT. NO. 72-002 P. 5, SERIES CRSF1

D10. FINAL SEASONAL FACTORS

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 88.5 | 89.3 | 91.6 | 96.2 | 103.9 | 112.9 | 114.7 | 114.4 | 105.8 | 100.1 | 93.4 | 8[illegible].1 | 100.0 |
| 1962 | 88.5 | 89.4 | 91.6 | 96.4 | 104.0 | 112.7 | 114.7 | 114.4 | 105.6 | 100.0 | 93.7 | 8[illegible].0 | 100.0 |
| 1963 | 88.5 | 89.4 | 91.6 | 96.8 | 103.8 | 112.3 | 114.6 | 114.4 | 105.4 | 100.1 | 94.3 | 8[illegible].9 | 100.0 |
| 1964 | 88.5 | 89.6 | 91.6 | 97.1 | 103.8 | 111.7 | 114.7 | 114.0 | 104.8 | 100.3 | 94.9 | 8[illegible].7 | 100.0 |
| 1965 | 88.8 | 90.1 | 91.8 | 97.4 | 103.8 | 110.9 | 114.5 | 113.3 | 104.3 | 100.5 | 95.6 | 8[illegible].6 | 100.0 |
| 1966 | 89.1 | 90.7 | 92.0 | 97.5 | 103.9 | 110.2 | 114.2 | 112.5 | 103.8 | 100.8 | 96.2 | 8[illegible].9 | 100.0 |
| 1967 | 89.4 | 91.2 | 92.1 | 97.4 | 103.9 | 109.7 | 114.1 | 111.8 | 103.6 | 101.1 | 96.4 | 8[illegible].2 | 100.0 |
| 1968 | 89.7 | 91.4 | 92.1 | 97.3 | 103.9 | 109.5 | 114.0 | 111.4 | 103.5 | 101.3 | 96.4 | 8[illegible].2 | 100.0 |

TABLE TOTAL- 9598.9 MEAN- 100.0 STD. DEVIATION- 9.1

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1969 | 89.9 | 91.6 | 92.2 | 97.3 | 103.9 | 109.4 | 114.0 | 111.3 | 103.5 | 101.4 | 96.4 | 8[illegible].3 | 100.0 |

restaurants and taverns, was projected at 94.6 to 106.6 for 1969. While both series appear to be converging over time, their range is nevertheless twice that of the business services for Canada.

Recreational services have the distinction of having the largest ranging seasonal adjustment factor of any services examined so far. The projected value for 1969 ranged from 89.3 to 114.0. This is only slightly changed from the initial values for the year 1961.

The month of the crest for the seasonal adjustment factor for the total services falls in June, which is not altogether unexpected (Table XXXIII). However, the trough which previously occurred in September, has lately fallen in January in the time series.

TABLE XXXIII

Final Seasonal Factors

| Series | Approximate Month of Factor | |
|---|---|---|
| | Trough | Crest |
| Total Services-Canada | Sept. - Jan. | June |
| Business Services | Dec. - Jan. | July - Aug. |
| Personal Services | Jan. - Feb. | July - Aug. |
| Hotels, Restaurants | January | August |
| Recreational Services | Dec. - Jan. | July |

Business services follow the conventional pattern. The crest of the seasonal adjustment factor falls around July and August. The trough occurs between December and January.

Personal services and hotels, restaurants and

taverns, both have the troughs of their seasonal adjustment factors falling in between January and February, which is in keeping with the nature of the series. The crests are found to occur in the summer months of July and August.

Recreational services have a conventional low winter pattern and high summer pattern for the adjustment factors. The troughs or low amplitudes occur in December and January, while the peaks or crests are seen to occur in July. Final deseasonalized data is displayed in Tables XXXIV - XXXV.

A number of points should be raised by way of summation for the seasonal analysis of the Canadian services. Firstly, the total services for Canada were found not to present a pattern of diverging seasonal adjustment factors, as was the case with the total Alberta services.

Secondly, the seasonal adjustment factors of the total Canadian services have the smallest standard deviation yet encountered. It must be admitted, however, that the total services for Alberta are also close enough to make the difference insignificant. Nevertheless, the standard deviations for the other aggregated Canadian services were found to be half the value of the same services in the province of Alberta.

Thirdly, the range of seasonal adjustment factors for the recreational services was the largest yet encountered. However, no comparison can be made for Alberta as this service was not enumerated for the province over the time span 1961 to 1968.

# TABLE XXXIV

JULY 1970 TOTAL SERVICES EMPLOYEES - CANADA (ALL FIRMS) DBS CAT. NO. 72-508 P. 6, SERIES CTSE2

D11. FINAL SEASONALLY ADJUSTED SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 101540. | 102338. | 103381. | 105107. | 106843. | 106287. | 106712. | 107720. | 111247. | 108689. | 109358. | 1091[illegible]5. | 1278384. |
| 1962 | 109051. | 109665. | 110789. | 110733. | 111162. | 112571. | 113120. | 113230. | 106715. | 113847. | 114326. | 1150[illegible]6. | 1340294. |
| 1963 | 115782. | 116477. | 117090. | 117877. | 118195. | 118791. | 118744. | 119518. | 122802. | 121258. | 121687. | 122320. | 1430548. |
| 1964 | 123178. | 124038. | 124639. | 125557. | 125996. | 126036. | 127509. | 127818. | 129565. | 129257. | 130034. | 1312[illegible]9. | 1524853. |
| 1965 | 132442. | 132830. | 132948. | 133464. | 134260. | 135777. | 136032. | 137549. | 138828. | 138919. | 140385. | 141016. | 1634476. |
| 1966 | 141450. | 142492. | 142578. | 144636. | 144751. | 145522. | 146300. | 146871. | 148618. | 148809. | 148280. | 149249. | 1749555. |
| 1967 | 149127. | 150832. | 153431. | 154213. | 155985. | 156833. | 158255. | 158777. | 159676. | 160024. | 161390. | 1620[illegible]5. | 1880615. |
| 1968 | 162809. | 163911. | 163816. | 164267. | 165672. | 166678. | 168629. | 168651. | 170608. | 171717. | 173675. | 1748[illegible]1. | 2015291. |
| AVGE | 129422. | 130323. | 131084. | 131982. | 132858. | 133562. | 134413. | 135017. | 136007. | 136565. | 137392. | 1381[illegible]6. | |

TABLE TOTAL- 12853961. MEAN- 133895. STD. DEVIATION- 20620.

All data to be read 1 decimal place right of indicated decimal.

JULY 1970 EMPLOYMENT INDEXES BUSINESS SERVICES - CANADA DBS CAT. NO. 72-002 P. 6, SERIES CBSE1

D11. FINAL SEASONALLY ADJUSTED SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | D.C | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 98369. | 99517. | 93915. | 99534. | 99791. | 99146. | 100263. | 99730. | 101188. | 101928. | 100520. | 1016[illegible]8. | 1199591. |
| 1962 | 102365. | 102491. | 103437. | 103384. | 102745. | 103339. | 102287. | 102455. | 102516. | 102582. | 104872. | 1054[illegible]7. | 1237848. |
| 1963 | 105187. | 105491. | 105033. | 106294. | 105958. | 108946. | 109339. | 111334. | 111576. | 111794. | 113415. | 1128[illegible]0. | 1307252. |
| 1964 | 114382. | 116781. | 113555. | 116578. | 119093. | 119399. | 122622. | 123727. | 126430. | 125649. | 125509. | 1273[illegible]6. | 1451063. |
| 1965 | 129559. | 130409. | 140055. | 135240. | 135171. | 135329. | 137393. | 138483. | 140091. | 143217. | 144841. | 1466[illegible]4. | 1657482. |
| 1966 | 148504. | 150081. | 149713. | 152462. | 154126. | 156833. | 156946. | 158593. | 160452. | 161818. | 163713. | 16[illegible]4[illegible]2. | 1879672. |
| 1967 | 164235. | 165643. | 164517. | 167481. | 170055. | 170358. | 169097. | 169332. | 168908. | 167136. | 167693. | 1678[illegible]3. | 2012294. |
| 1968 | 170039. | 171478. | 169045. | 171182. | 172726. | 170278. | 171983. | 172518. | 174737. | 178721. | 179118. | 17[illegible]4[illegible]3. | 2080274. |
| AVGE | 129080. | 130225. | 130542. | 131519. | 132458. | 132954. | 133741. | 134522. | 135737. | 136606. | 137460. | 13[illegible]3[illegible]3. | |

TABLE TOTAL- 12825451. MEAN- 133598. STD. DEVIATION- 27899.

All data to be read 3 decimal places left of indicated decimal.

JULY 1970 EMPLOYMENT INDFXES PERSONAL SERVICES - CANADA DBS CAT. NO. 72-002 P. 6, SERIES CPSE1

D11. FINAL SEASONALLY ADJUSTED SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | D C | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 98781. | 98695. | 99366. | 99773. | 99644. | 100464. | 100537. | 100406. | 100062. | 100295. | 100532. | 1010[illegible]4. | 11995[illegible]7. |
| 1962 | 100078. | 99752. | 100009. | 100449. | 101247. | 101356. | 101617. | 101313. | 101059. | 101043. | 101325. | 1016[illegible]3. | 1210984. |
| 1963 | 102[illegible]34. | 102542. | 102842. | 103392. | 104071. | 104413. | 104838. | 105363. | 106[illegible]9[illegible]. | 106892. | 107215. | [illegible]081[illegible]5. | 1257956. |
| 1964 | 108541. | 109453. | 109982. | 109743. | 110591. | 111441. | 112189. | 113302. | 114077. | 114577. | 115353. | 11[illegible]6[illegible]4. | 1344657. |
| 1965 | 116048. | 116330. | 117284. | 118176. | 118850. | 119883. | 120646. | 120908. | 121519. | 121978. | 123867. | 1249[illegible]2. | 14404[illegible]9. |
| 1966 | 126045. | 127460. | 127809. | 128746. | 128765. | 129567. | 129817. | 131505. | 132388. | 133020. | 133969. | 1347[illegible]1. | 1563[illegible]3. |
| 1967 | 136574. | 137743. | 138576. | 139928. | 141482. | 142034. | 142475. | 142646. | 143389. | 144744. | 143958. | 1444[illegible]7. | 1698026. |
| 1968 | 143860. | 143458. | 144475. | 144002. | 144276. | 143306. | 144366. | 145309. | 147912. | 149136. | 150102. | 1490[illegible]4. | 17492[illegible]3. |
| AVGE | 116508. | 116929. | 117543. | 118026. | 118609. | 119066. | 119560. | 120094. | 120817. | 121467. | 122040. | 12[illegible]4[illegible]0. | |

TABLE TOTAL- 11464918. MEAN- 119426. STD. DEVIATION- 17052.

All data to be read 3 decimal places left of indicated decimal.

# TABLE XXXV

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                JULY 1970   HOTEL,RESTAURANT EMPLOYEES - CANADA (20+ EMPL.)DBS CAT. NO. 72-002    P. 6, SERIES CHS[illegible]
D11.  FINAL SEASONALLY ADJUSTED SERIES
  YEAR       JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      D.C                TOTAL
  1961     69659.   69881.   70309.   71713.   72417.   73673.   73839.   74291.   76044.   74841.   75645.  760[illegible]3.    87[illegible]74.
  1962     76067.   76318.   76938.   77288.   77932.   77954.   78407.   77975.   74069.   76647.   77196.  7[illegible]5[illegible]6.   924[illegible].
  1963     77992.   78551.   78853.   79346.   79971.   81013.   81159.   81915.   83964.   84238.   84425.  854[illegible]7.    97[illegible]23.
  1964     85986.   86677.   87265.   87516.   87810.   88504.   89783.   90743.   91969.   91835.   92734.  929[illegible]8.    10737[illegible].
  1965     94015.   94137.   95084.   95625.   97454.   97903.   99231.   99310.  100351.  101146.  102263.  1029[illegible]7.   1179465.
  1966    103255.  104448.  105301.  106451.  107249.  107473.  107559.  109586.  111557.  110954.  112539.  [illegible]136[illegible]9.   1300[illegible]9.
  1967    114513.  116544.  117649.  119015.  119664.  120833.  120750.  121044.  121521.  122485.  122571.  1279[illegible]2.   14395[illegible]8.
  1968    123332.  127860.  123434.  123184.  122943.  122292.  123915.  124765.  126509.  129197.  129387.  12[illegible]2[illegible]7.   1501[illegible]9.

  AVGE     93102.   93677.   94354.   95017.   95680.   96206.   96830.   97453.   98248.   98918.   99590.  1001[illegible]9.
            TABLE TOTAL-  9273442.        MEAN-  96598.         STD. DEVIATION-  18577.
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                JULY 1970   EMPLOYMENT INDEXES RECREATIONAL SERVICES - CAN.DBS CAT. NO. 72-002    P. 6, SERIES CRS[illegible]
D11.  FINAL SEASONALLY ADJUSTED SERIES
  YEAR       JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      D.C                TOTAL
  1961    101531.  102765.  103097.  100694.  102480.   956[illegible]9.   97016.   95430.   96405.   95491.  101973.  10[illegible]7[illegible]7.   1202247.
  1962    102061.  101702.  100253.   98298.   99455.  102557.  101905.  102105.  103[illegible]23.  100759.   96271.  1017[illegible]3.   1210340.
  1963    102190.  101235.  102106.  103236.  104589.  105352.  105612.  105579.  106583.  106059.  104800.  103[illegible]4.   1251220.
  1964    104899.  105510.  107278.  109156.  107990.  108178.  109880.  111794.  112573.  112513.  114422.  11[illegible]3[illegible]7.   1314539.
  1965    109578.  112248.  112048.  114023.  116605.  118063.  117653.  120940.  117108.  116368.  121671.  1256[illegible]4.   140[illegible]9[illegible]6.
  1966    123291.  123014.  126505.  127078.  125176.  1240[illegible]0.  127836.  128843.  129125.  131403.  134118.  13[illegible]6[illegible]0.   1531311.
  1967    134159.  135770.  134805.  132845.  133957.  135191.  134665.  132627.  136263.  139377.  134228.  1418[illegible]3.   16257[illegible]0.
  1968    145122.  143479.  138397.  141795.  143704.  141774.  143700.  143[illegible]83.  147002.  147219.  147599.  14[illegible]9[illegible].   1731273.

  AVGE    115354.  115715.  115561.  115898.  115744.  1167[illegible]9.  117291.  117[illegible]28.  118566.  118773.  119385.  12[illegible].
            TABLE TOTAL- 11268646.        MEAN- 117362.         STD. DEVIATION-  15907.
```

All data to be read 3 decimal places left of indicated decimal.

Fourthly, all of the Canadian services follow a conventional pattern of crests and troughs for their seasonal adjustment factors. Crests are found to occur in the summer months, and low amplitudes or troughs in the winter months.

And fifthly, of all the series examined in this project so far, the total services for Canada were found to be the least sensitive seasonally, followed closely by the total services for Alberta.

## CYCLICAL ANALYSIS

The aggregated services for Canada as a whole have a smoother cyclical factor than the same services for the province of Alberta (Table XXXVI). The MCD of the total services for Canada is one. This not only implies that monthly changes in the series are economically significant, but that the series is smooth in appearance due to the fact that the cyclical factor dominates the irregular factor continually.

TABLE XXXVI

Months for Cyclical Dominance

| Series | MCD |
|---|---|
| Total Services-Canada | 1 |
| Business Services | 2 |
| Personal Services | 1 |
| Hotels, Restaurants | 1 |
| Recreational Services | 3 |

For the business services in Canada the MCD is 2 for the years 1961 through 1968. This implies that, significant changes occur in the seasonally adjusted data only every

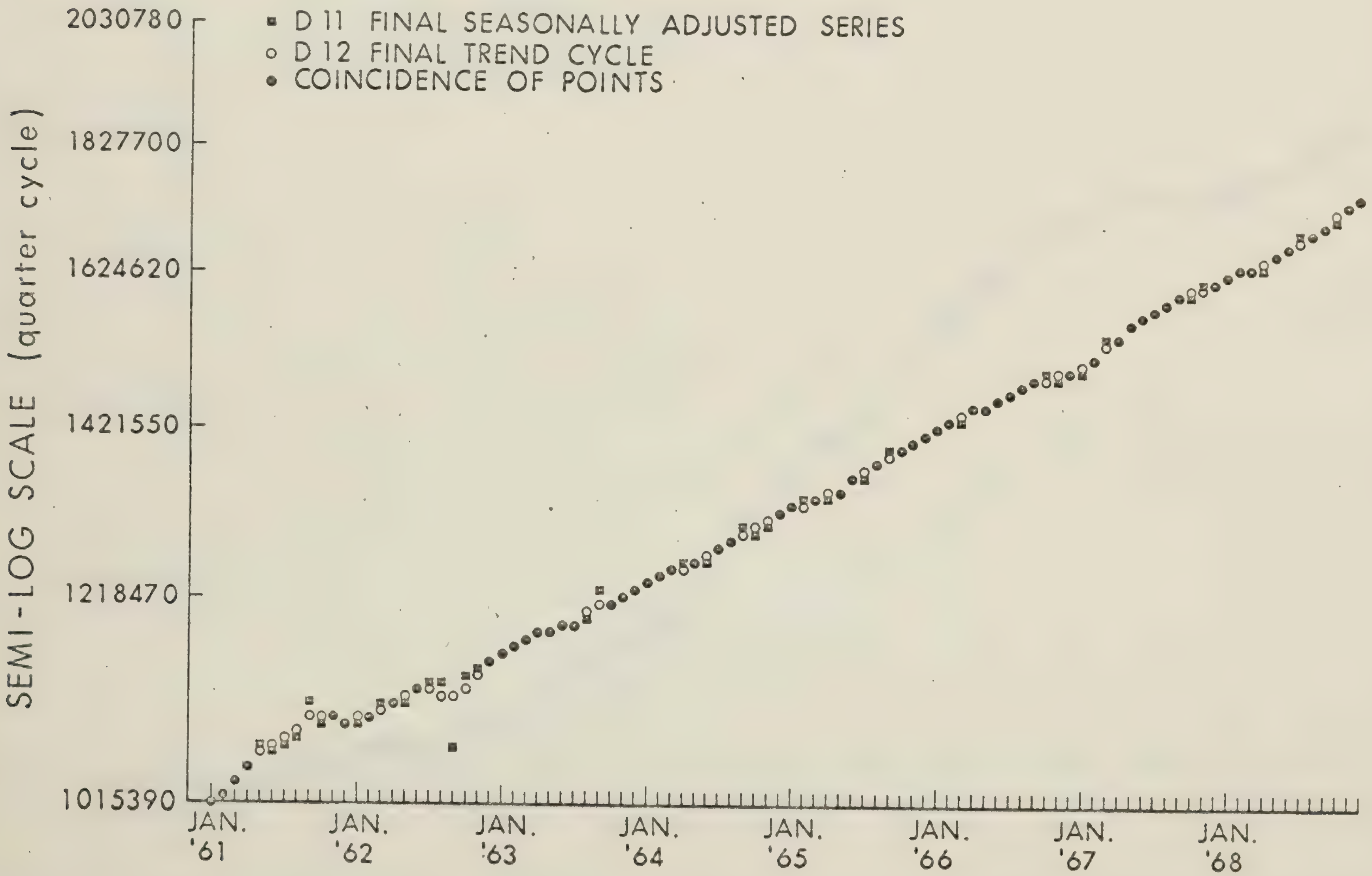
other month.

It is most surprising indeed to find a volatile series such as personal services and its largest subgroup, hotels, restaurants and taverns, with MCD's of only one. This is an MCD value of one less than for the comparable Alberta series.

Recreational services have the cyclical factor dominating the irregular only every third month. This indicates that the irregular factor is rather large in this series. There is no recreational service tabulated for the province of Alberta, possibly due to the fact that it was but a small industry at the date of compilation by the DBS. However, a pattern does seem to be emerging with regard to the MCD's for the Canadian services versus the Alberta services. The Canadian series have a more dominant cyclical factor, and for individual service industries, the MCD for each industry is one less than the comparable service for Alberta. Thus, indulging in some armchair speculation, it is possible that on this basis the Alberta recreational services will have an MCD of about 4 when tabulated. This does not seem unlikely for any newly emerging industry, which would conceivably be subject to a highly active irregular factor.

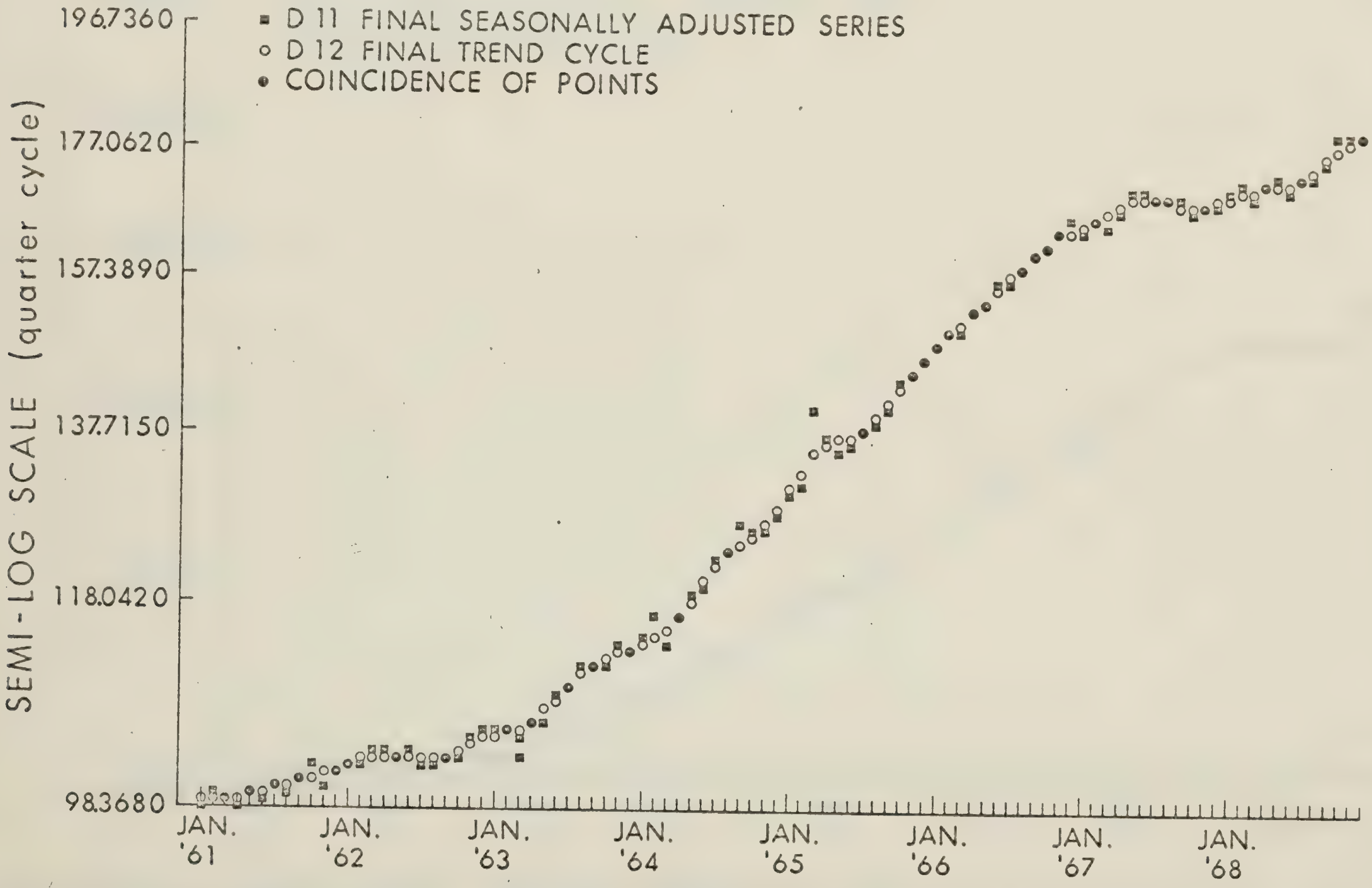
The secular growth of the total services in Canada falls little short of spectacular (Charts XXV - XXIX and Tables XXXVII - XXXVIII). Observing the graphical print-outs of the cyclical series and the seasonally adjusted series, the emergant growth pattern follows a straight line. Total

Chart XXV



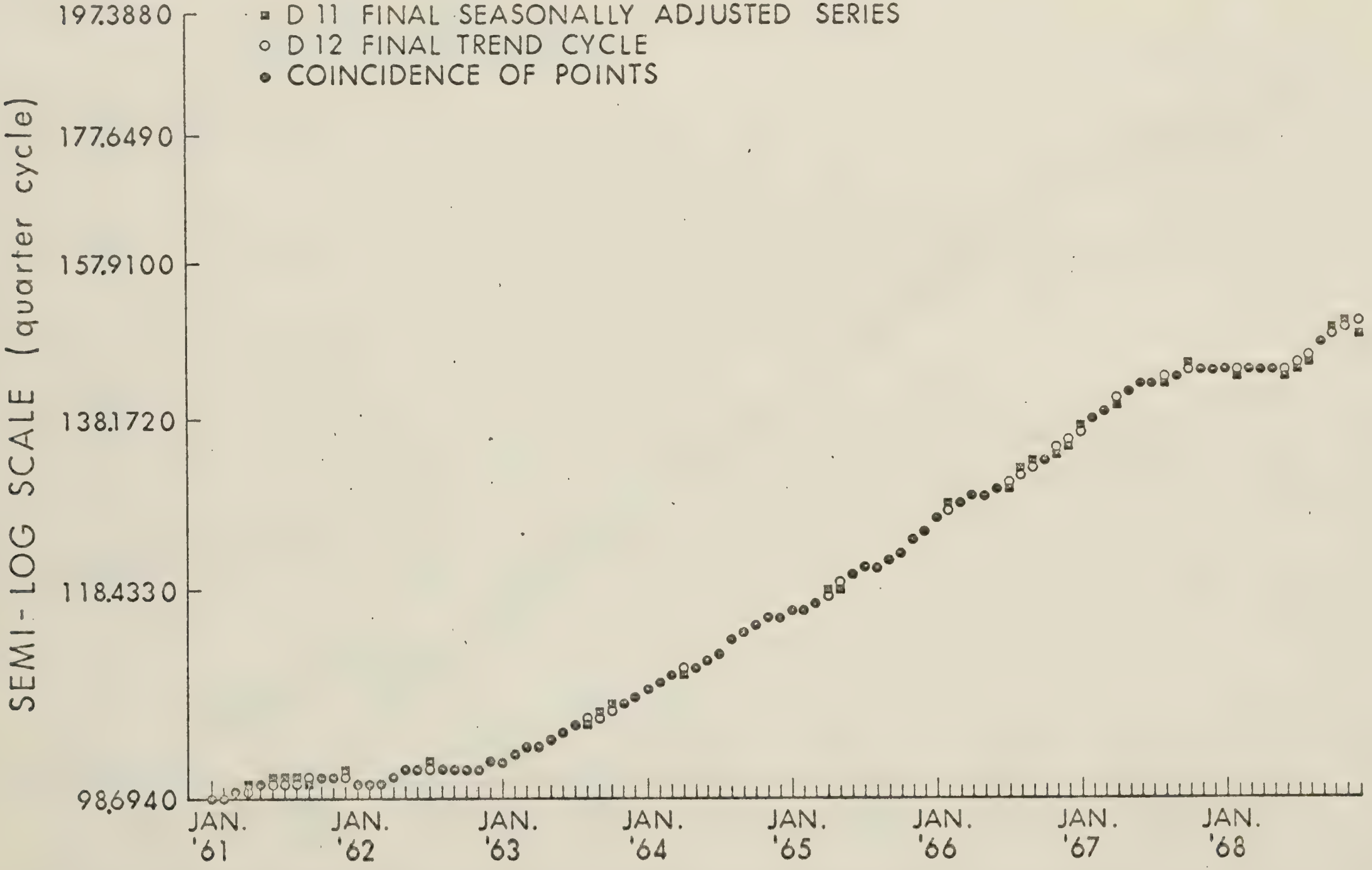
JULY 1970 TOTAL SERVICES EMPLOYEES - CANADA (ALL FIRMS) DBS CAT. No. 72-508

Chart XXVI



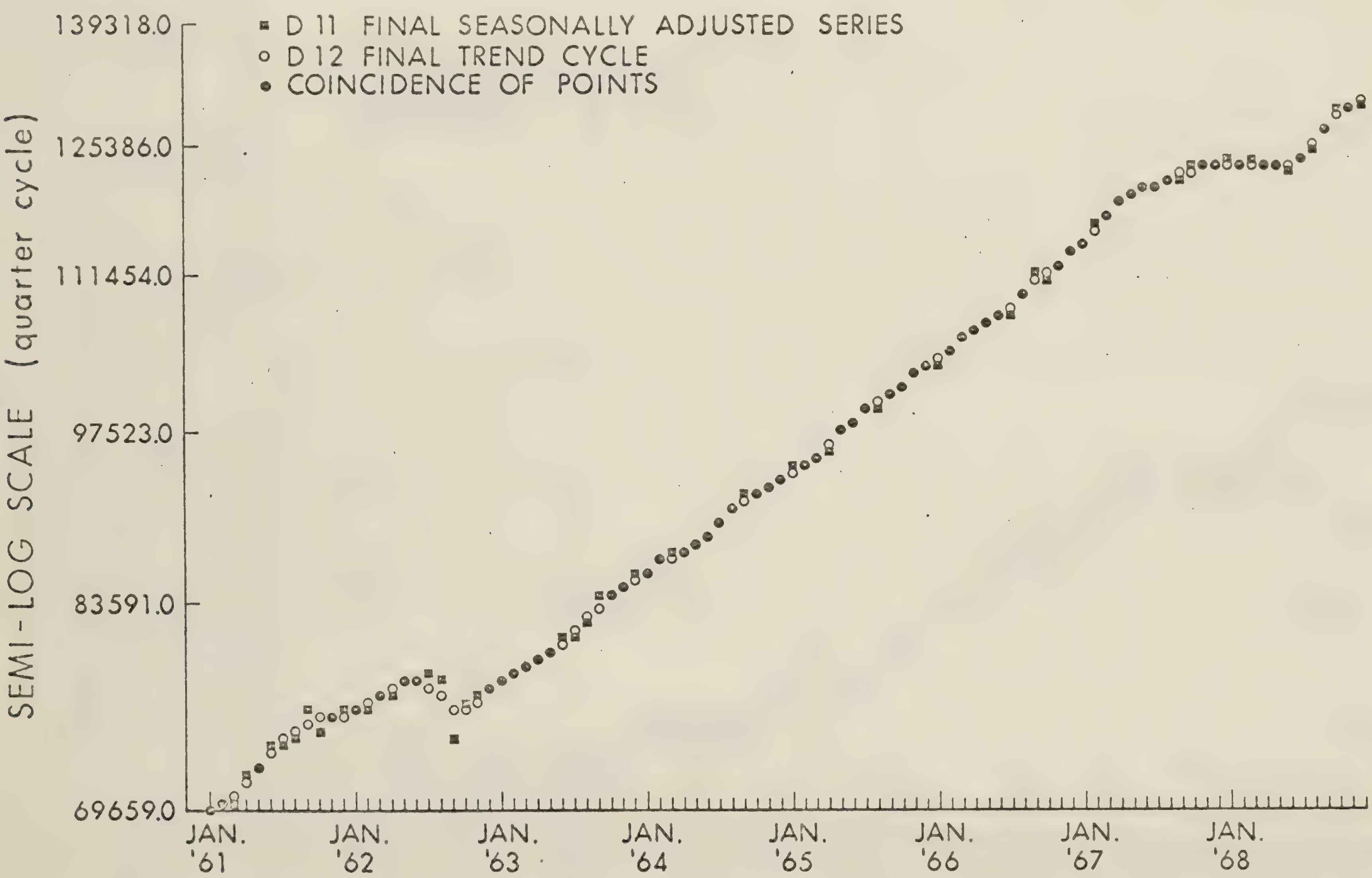
JULY 1970 EMPLOYMENT INDEXES BUSINESS SERVICES - CANADA DBS CAT. No. 72-002

Chart XXVII



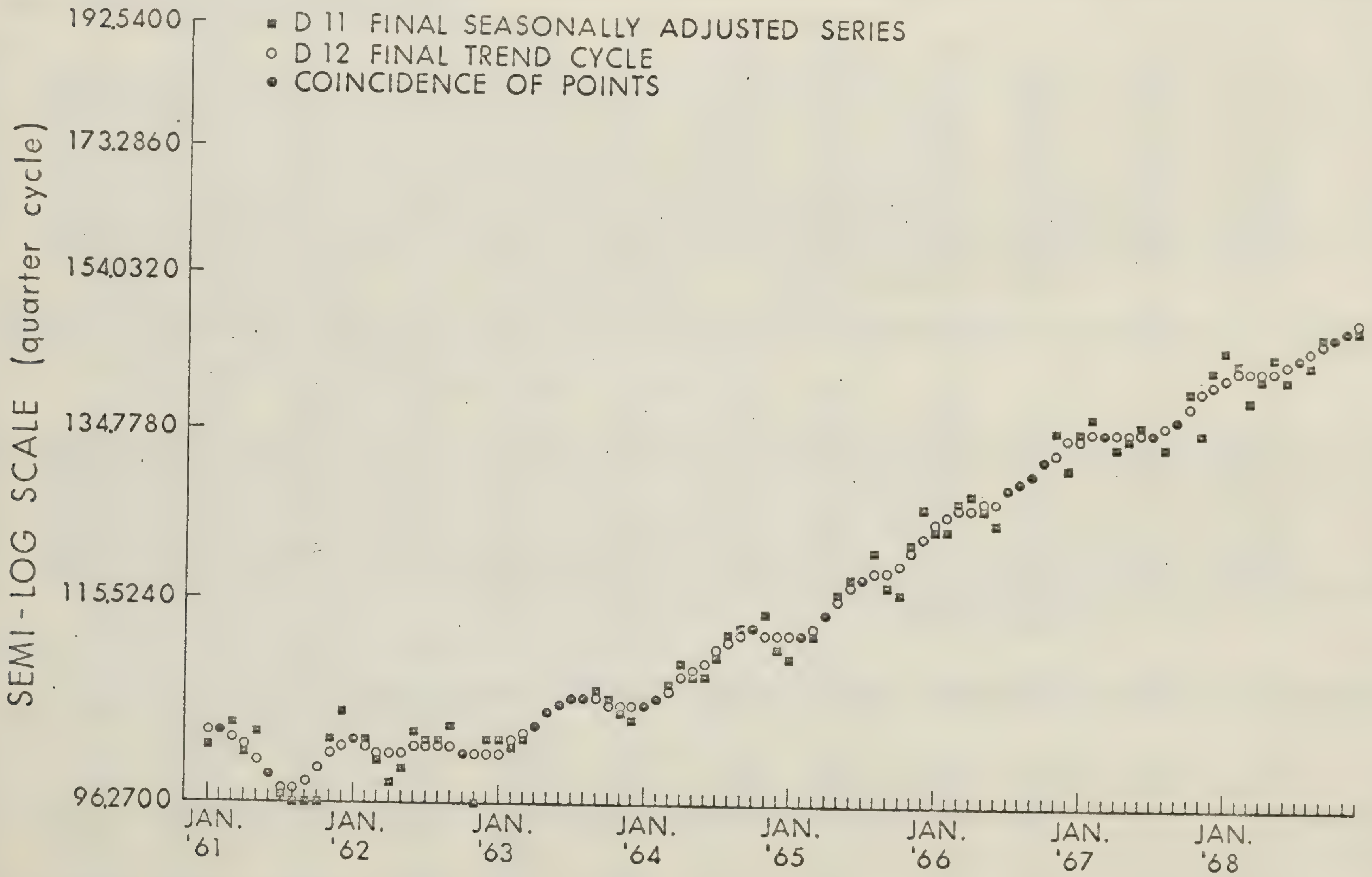
JULY 1970 EMPLOYMENT INDEXES PERSONAL SERVICES - CANADA DBS CAT. No. 72-002

Chart XXVIII



JULY 1970 HOTEL, RESTAURANT EMPLOYEES - CANADA (20+ EMPL.) DBS CAT. No. 72-002

Chart XXIX



JULY 1970 EMPLOYMENT INDEXES RECREATIONAL SERVICES-CANADA DBS CAT. No. 72-002

# TABLE XXXVII

JULY 1970 TOTAL SERVICES EMPLOYEES - CANADA (ALL FIRMS) DBS CAT. NO. 72-508 P. 7, SERIES CTSE2
D12. FINAL TREND CYCLE - HENDERSON CURVE
9-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 0.97

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DFC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 101270. | 102500. | 103759. | 104998. | 105876. | 106621. | 107447. | 108380. | 109206. | 109575. | 109386. | 109150. | 1278165. |
| 1962 | 109298. | 109776. | 110273. | 110909. | 111875. | 112344. | 112070. | 111492. | 111330. | 112077. | 113594. | 115112. | 1340150. |
| 1963 | 116035. | 116474. | 117161. | 117753. | 118148. | 118575. | 119221. | 120049. | 120865. | 121495. | 121961. | 122423. | 1430159. |
| 1964 | 123104. | 123981. | 124723. | 125354. | 125889. | 126515. | 127289. | 128114. | 128874. | 129579. | 130354. | 131237. | 1525012. |
| 1965 | 132060. | 132682. | 133132. | 133647. | 134376. | 135366. | 136436. | 137467. | 138451. | 139358. | 140173. | 140883. | 1634020. |
| 1966 | 141662. | 142509. | 143365. | 144212. | 144925. | 145565. | 146319. | 147136. | 147868. | 148384. | 148723. | 149168. | 1749833. |
| 1967 | 149989. | 151287. | 152829. | 154386. | 155817. | 157027. | 158009. | 158848. | 159591. | 160353. | 161203. | 162114. | 1881449. |
| 1968 | 162883. | 163469. | 163988. | 164656. | 165498. | 166547. | 167720. | 168975. | 170395. | 171917. | 173434. | 174890. | 2014367. |
| AVGE | 129538. | 130335. | 131154. | 131989. | 132801. | 133570. | 134314. | 135058. | 135822. | 136592. | 137353. | 138122. | |

TABLE TOTAL- 12853138. MEAN- 133887. STD. DEVIATION- 20602.

All data to be read 1 decimal place right of indicated decimal.

JULY 1970 EMPLOYMENT INDEXES BUSINESS SERVICES - CANADA DBS CAT. NO. 72-002 P. 7, SERIES CBSE1
D12. FINAL TREND CYCLE - HENDERSON CURVE
13-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 1.11

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 98725. | 98856. | 98976. | 99112. | 99304. | 99589. | 99949. | 100352. | 100738. | 101082. | 101442. | 101836. | 1199960. |
| 1962 | 102248. | 102651. | 102965. | 103126. | 103045. | 102795. | 102593. | 102597. | 102901. | 103449. | 104096. | 104663. | 1237127. |
| 1963 | 105080. | 105369. | 105708. | 106262. | 107166. | 108312. | 109516. | 110607. | 111555. | 112314. | 112879. | 113371. | 1308137. |
| 1964 | 113858. | 114509. | 115446. | 116731. | 118359. | 120159. | 121870. | 123334. | 124345. | 125213. | 126431. | 128195. | 1448448. |
| 1965 | 130371. | 132635. | 134547. | 135817. | 136484. | 136901. | 137523. | 138688. | 140502. | 142670. | 144705. | 146505. | 1657346. |
| 1966 | 148104. | 149584. | 151034. | 152545. | 154130. | 155714. | 157349. | 159015. | 160671. | 162183. | 163425. | 164336. | 1878088. |
| 1967 | 165058. | 165763. | 166611. | 167622. | 168623. | 169336. | 169500. | 169103. | 168534. | 168151. | 168191. | 168649. | 2015140. |
| 1968 | 169330. | 170020. | 170540. | 170781. | 170921. | 171331. | 172245. | 173628. | 175237. | 176786. | 178170. | 179358. | 2078344. |
| AVGE | 129097. | 129923. | 130728. | 131502. | 132254. | 133017. | 133818. | 134665. | 135561. | 136481. | 137417. | 138362. | |

TABLE TOTAL- 12822565. MEAN- 133568. STD. DEVIATION- 27874.

All data to be read 3 decimal places left of indicated decimal.

JULY 1970 EMPLOYMENT INDEXES PERSONAL SERVICES - CANADA DBS CAT. NO. 72-002 P. 7, SERIES CPSF1
D12. FINAL TREND CYCLE - HENDERSON CURVE
9-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 0.49

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DFC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 98694. | 98976. | 99280. | 99572. | 99845. | 100043. | 100150. | 100214. | 100288. | 100375. | 100437. | 100376. | 1198248. |
| 1962 | 100191. | 100049. | 100158. | 100539. | 101015. | 101340. | 101415. | 101293. | 101162. | 101159. | 101343. | 101680. | 1211347. |
| 1963 | 102073. | 102491. | 102947. | 103434. | 103921. | 104399. | 104913. | 105476. | 106107. | 106754. | 107382. | 108028. | 1257923. |
| 1964 | 108694. | 109308. | 109814. | 110245. | 110744. | 111423. | 112278. | 113183. | 114004. | 114687. | 115205. | 115607. | 1345189. |
| 1965 | 116028. | 116553. | 117239. | 118091. | 118983. | 119789. | 120417. | 120972. | 121623. | 122496. | 123654. | 124936. | 1440779. |
| 1966 | 126162. | 127179. | 127948. | 128502. | 128972. | 129571. | 130376. | 131305. | 132222. | 133076. | 134012. | 135098. | 1564422. |
| 1967 | 136311. | 137580. | 138855. | 140080. | 141136. | 141912. | 142495. | 143011. | 143573. | 144086. | 144284. | 144189. | 1697511. |
| 1968 | 143996. | 143961. | 144011. | 143961. | 143841. | 143905. | 144545. | 145893. | 147481. | 148817. | 149825. | 150591. | 1750826. |
| AVGE | 116519. | 117012. | 117532. | 118053. | 118557. | 119048. | 119574. | 120169. | 120807. | 121431. | 122018. | 122563. | |

TABLE TOTAL- 11466217. MEAN- 119440. STD. DEVIATION- 17083.

All data to be read 3 decimal places left of indicated decimal.

## TABLE XXXVIII

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                    JULY 1970   HOTEL,RESTAURANT EMPLOYEES - CANADA (20+ EMPL.)DBS CAT. NO. 72-002     P. 7, SERIES CHSF1
 D12.  FINAL TREND CYCLE - HENDERSON CURVE
                     9-TERM MOVING AVERAGE SELECTED.   I/C RATIO IS  0.71
   YEAR      JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC            TOTAL
   1961    69373.  69959.  70688.  71543.  72417.  73295.  74054.  74654.  75118.  75441.  75654.  75834.          878031.
   1962    76097.  76480.  76872.  77355.  77955.  78162.  77737.  76940.  76295.  76208.  76729.  77518.          924349.
   1963    78112.  78435.  78899.  79448.  80008.  80644.  81446.  82347.  83263.  84099.  84797.  85395.          976894.
   1964    86022.  86645.  87106.  87488.  87982.  88727.  89683.  90669.  91472.  92093.  92618.  93147.         1073650.
   1965    93698.  94361.  95145.  96116.  97146.  98101.  98878.  99594. 100378. 101223. 102045. 102819.         1179504.
   1966   103561. 104422. 105403. 106276. 106892. 107508. 108376. 109494. 110716. 111775. 112658. 113619.         1300687.
   1967   114872. 116294. 117675. 118908. 119845. 120441. 120866. 121243. 121678. 122196. 122667. 122963.         1439645.
   1968   123126. 123201. 123168. 123060. 123013. 123168. 123837. 125155. 126750. 128192. 129374. 130327.         1502379.

   AVGE    93108.  93725.  94370.  95024.  95657.  96256.  96860.  97512.  98209.  98903.  99568. 100203.
              TABLE TOTAL-  9275109.         MEAN-  96616.          STD. DEVIATION-  18602.

                    JULY 1970   EMPLOYMENT INDEXES RECREATIONAL SERVICES - CAN.DBS CAT. NO. 72-002     P. 7, SERIES CRSF1
 D12.  FINAL TREND CYCLE - HENDERSON CURVE
                     13-TERM MOVING AVERAGE SELECTED.   I/C RATIO IS  1.90
   YEAR      JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC            TOTAL
   1961   102832. 102523. 101983. 101234. 100064.  98707.  97620.  97282.  97834.  99041. 100426. 101415.         1200940.
   1962   101718. 101430. 100912. 100596. 100803. 101270. 101565. 101538. 101140. 100639. 100297. 100319.         1212227.
   1963   100842. 101645. 102594. 103498. 104293. 105034. 105654. 105906. 105771. 105396. 105049. 104986.         1250667.
   1964   105289. 105900. 106709. 107606. 108459. 109351. 110340. 111299. 112035. 112383. 112267. 111879.         1313516.
   1965   111681. 111994. 112941. 114360. 115825. 116936. 117636. 118206. 118815. 119619. 120780. 122202.         1400993.
   1966   123556. 124586. 125245. 125634. 125999. 126618. 127493. 128555. 129795. 131140. 132326. 133205.         1534149.
   1967   133808. 134196. 134332. 134256. 134192. 134222. 134481. 135170. 136314. 137773. 139308. 140718.         1628766.
   1968   141732. 142254. 142373. 142352. 142418. 142816. 143671. 144727. 145785. 146732. 147546. 148284.         1730693.

   AVGE   115182. 115566. 115887. 116188. 116507. 116869. 117308. 117832. 118436. 119090. 119750. 120301.
              TABLE TOTAL- 11271922.         MEAN- 117416.          STD. DEVIATION-  15862.
```

All data to be read 3 decimal places left of indicated decimal.

services in Canada grew from 1,012,700 employees in January, 1961, to 1,748,900 in December of 1968, in terms of the secular factor.

Business services in Canada did not gain its impetus for rapid growth until May of 1964. Preceding this time the secular factor had been growing slowly in somewhat of a step fashion. After May, 1964, however, growth became accelerated and continued in linear fashion until January, 1967, when once again it levelled off. In January of 1961 the secular factor for business services had an employment index of 98.73, while by December of 1968 this had increased to 179.36.

Personal services did not really begin to grow until January, 1963. The secular factor then began a linear growth which did not terminate until October of 1967. Over the time span of 1961 to 1968, the personal services rose from an index value of 98.69 in January of 1961, to 150.59 in December, 1968.

The group associated with personal services, hotels, restaurants and taverns, began their rapid secular growth as early as October, 1962. However, this growth too levelled off during October of 1967. Hotels, restaurants and taverns increased from a low of 690,373 employees in January of 1961, to a peak value of 1,303,370 in December, 1968.

The recreational services during the period 1961 to 1968 grew in secular terms by the staircase method previously encountered, with intervals of roughly a half a year before

an increase occurred. The growth of these services was not as spectacular as that of the other services. Growth occurred from a trough of 97.28 in August of 1961, to a peak index of only 148.28 in December of 1968.

Also printed along with the Henderson moving average method of deriving the secular factor, are the tables depicting the cyclical factors obtained by using a moving average of a period equal to the MCD on the seasonally adjusted data. It can be seen from the print-outs that the results are rather similar (Table XL).

The average duration of run table can be used to determine whether or not a series is essentially random (Table XXXIX). It has been observed that for a series to be considered random, its average duration of run should fall between 1.36 and 1.65, 95% of the time. From the chart above, it is seen that the irregular factor can be considered random for all series but the recreational services.

TABLE XXXIX

Average Duration of Run

| Series | Irregular (I) | Seasonally Adjusted (CI) | Moving Average (Period=MCD) |
|---|---|---|---|
| Total Services-Canada | 1.42 | 4.13 | 4.13 |
| Business Services | 1.40 | 2.26 | 3.92 |
| Personal Services | 1.56 | 4.52 | 4.52 |
| Hotels, Restaurants | 1.38 | 5.94 | 5.94 |
| Recreational Services | 1.90 | 2.02 | 4.23 |

Not one of the seasonally adjusted series could be classified as a random series. But as has been stated before,

this is most likely due to the dominance of the irregular factor in the monthly series.

The moving average of a random series has an expected average run of 2.0, regardless of the period of the MCD average. Thus, it is obvious that none of the above series is random and can safely be said to represent the cyclical movement of the series only. The original series is again included in the Tables XLI - XLII.

# TABLE XL

JULY 1970 EMPLOYMENT INDEXES RECREATIONAL SERVICES - CAN.DBS CAT. NO. 72-002 P. 5, SERIES CRSE1

F 1. MCD MOVING AVERAGE
MCD IS 3

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | ******* | 102464. | 102185. | 102070. | 100594. | 99363. | 97353. | 96624. | 96448. | 99289. | 101067. | 1029 4. | 1099412. |
| 1962 | 102632. | 101338. | 100044. | 99335. | 100123. | 101306. | 102189. | 102411. | 102029. | 100084. | 99594. | 1000 1. | 1211378. |
| 1963 | 101726. | 101844. | 102212. | 103320. | 104412. | 105186. | 105493. | 105904. | 106050. | 105814. | 104914. | 1045 8. | 1251412. |
| 1964 | 104764. | 105896. | 107315. | 108141. | 108475. | 108666. | 109931. | 111412. | 112 90. | 113169. | 112444. | 1114 6. | 1313917. |
| 1965 | 110741. | 111291. | 112773. | 114225. | 116230. | 117440. | 118885. | 118567. | 118139. | 118382. | 121237. | 1235 5. | 1401456. |
| 1966 | 123794. | 124270. | 125532. | 126253. | 125413. | 125687. | 126910. | 128084. | 129357. | 131615. | 132066. | 13 9 4. | 1533267. |
| 1967 | 133535. | 134911. | 134474. | 133869. | 133998. | 134604. | 134161. | 134519. | 136089. | 136623. | 138499. | 14 4 4. | 1625694. |
| 1968 | 143498. | 142333. | 141224. | 141299. | 142424. | 143059. | 143012. | 144755. | 145928. | 147273. | 147530. | ******* | 1582384. |
| AVGE | 117299. | 115543. | 115725. | 116068. | 116451. | 116915. | 117242. | 117559. | 118354. | 118906. | 119675. | 1165 2. | |

TABLE TOTAL- 11018896. All data to be read 3 decimal places left of indicated decimal.

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JULY 1970 TOTAL SERVICES EMPLOYEES - CANADA (ALL FIRMS) DBS CAT. NO. 72-508 P. 5, SERIES CTSE2

F 1. MCD MOVING AVERAGE
MCD IS 1
SEE TABLE D11

---

JULY 1970 EMPLOYMENT INDEXES BUSINESS SERVICES - CANADA DBS CAT. NO. 72-002 P. 5, SERIES CBSE1

F 1. MCD MOVING AVERAGE
MCD IS 2

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | ******* | 98943. | 99217. | 98725. | 99162. | 99469. | 99705. | 99997. | 100459. | 101558. | 101224. | 1011 4. | 1099562. |
| 1962 | 102027. | 102383. | 102944. | 103436. | 103065. | 103042. | 102813. | 102371. | 102485. | 102549. | 103727. | 1051 4. | 1235983. |
| 1963 | 105302. | 105339. | 105761. | 105662. | 106176. | 107452. | 109142. | 110336. | 111455. | 111685. | 112605. | 1131 3. | 1303515. |
| 1964 | 113636. | 115592. | 115175. | 115073. | 117835. | 119246. | 121010. | 123174. | 125078. | 126039. | 125579. | 126418. | 1443844. |
| 1965 | 128443. | 129984. | 135233. | 138149. | 135705. | 135250. | 136361. | 137938. | 139787. | 141654. | 144029. | 1457 8. | 1647757. |
| 1966 | 147590. | 149292. | 149397. | 151088. | 153294. | 155480. | 156890. | 157770. | 159523. | 161135. | 162765. | 1650 3. | 1869801. |
| 1967 | 165333. | 164939. | 165193. | 165999. | 168768. | 170206. | 169727. | 169215. | 169120. | 168022. | 167414. | 1677 8. | 2011589. |
| 1968 | 168941. | 170758. | 170261. | 170113. | 171954. | 171502. | 171131. | 172251. | 173628. | 176729. | 178919. | 1787 5. | 2074970. |
| AVGE | 133040. | 129652. | 130383. | 131031. | 131989. | 132706. | 133347. | 134131. | 135129. | 136171. | 137033. | 1379 1. | |

TABLE TOTAL- 12637035.

All data to be read 3 decimal places left of indicated decimal.

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JULY 1970 EMPLOYMENT INDEXES PERSONAL SERVICES - CANADA DBS CAT. NO. 72-002 P. 5, SERIES CPSE1

F 1. MCD MOVING AVERAGE
MCD IS 1
SEE TABLE D11

---

JULY 1970 HOTEL,RESTAURANT EMPLOYEES - CANADA (20+ EMPL.)DBS CAT. NO. 72-002 P. 5, SERIES CHSE1

F 1. MCD MOVING AVERAGE
MCD IS 1
SEE TABLE D11

# TABLE XLI

JULY 1970 TOTAL SERVICES EMPLOYEES - CANADA (ALL FIRMS) DBS CAT. NO. 72-508 P. 1, SERIES CTSF2

B 1. ORIGINAL SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 101020. | 101810. | 103340. | 104930. | 108090. | 107970. | 106730. | 107230. | 108470. | 109540. | 110240. | 1058 0. | 1275170. |
| 1962 | 108580. | 109180. | 110750. | 110520. | 112390. | 114340. | 113130. | 112690. | 104310. | 114710. | 115250. | 1147 0. | 1340570. |
| 1963 | 115260. | 115990. | 117000. | 117560. | 119260. | 120640. | 118820. | 118980. | 120480. | 122320. | 122740. | 1220 0. | 1431110. |
| 1964 | 122440. | 123400. | 124370. | 125010. | 126880. | 127970. | 127600. | 127130. | 127980. | 130310. | 131060. | 1308 0. | 1525010. |
| 1965 | 131550. | 132110. | 132570. | 132720. | 135030. | 137840. | 136240. | 136710. | 138000. | 139990. | 141390. | 1404 0. | 1634640. |
| 1966 | 140400. | 141640. | 142060. | 143640. | 145550. | 147750. | 146590. | 145910. | 148750. | 149910. | 149440. | 1487 0. | 1750380. |
| 1967 | 147690. | 149680. | 152680. | 152930. | 156770. | 159270. | 158720. | 157770. | 160150. | 161240. | 162670. | 1614 0. | 1880970. |
| 1968 | 161100. | 162560. | 162970. | 162830. | 166500. | 169320. | 169170. | 167550. | 171230. | 172980. | 174900. | 1740 0. | 2015110. |
| AVGE | 128505. | 129546. | 130718. | 131268. | 133809. | 135638. | 134625. | 134246. | 134921. | 137625. | 138469. | 1376 9. | |

TABLE TOTAL- 12856060. MEAN- 133917. STD. DEVIATION- 20692.

All data to be read 1 decimal place right of indicated decimal.

JULY 1970 EMPLOYMENT INDEXES BUSINESS SERVICES - CANADA DBS CAT. NO. 72-002 P. 1, SERIES CPSC1

B 1. ORIGINAL SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 96000. | 97600. | 97600. | 95900. | 99200. | 101200. | 102800. | 103200. | 104000. | 102300. | 100600. | 991 0. | 1199500. |
| 1962 | 99900. | 100300. | 102400. | 100700. | 102200. | 105400. | 104900. | 106000. | 105300. | 103000. | 104900. | 1027 0. | 1237700. |
| 1963 | 102600. | 103100. | 104200. | 103700. | 105500. | 111100. | 112100. | 115200. | 114500. | 112300. | 113500. | 1101 0. | 1307900. |
| 1964 | 111300. | 113800. | 112900. | 113900. | 118800. | 121800. | 125600. | 127900. | 129500. | 126200. | 125500. | 1241 0. | 1451300. |
| 1965 | 126000. | 127100. | 139200. | 133400. | 135400. | 138100. | 140600. | 142900. | 143200. | 143900. | 144700. | 1429 0. | 1657400. |
| 1966 | 144300. | 146300. | 148100. | 149500. | 155000. | 160100. | 160500. | 163300. | 163600. | 162900. | 163600. | 1632 0. | 1880400. |
| 1967 | 159400. | 161500. | 163300. | 164300. | 170500. | 174000. | 172800. | 174000. | 172200. | 168400. | 167600. | 1646 0. | 2012600. |
| 1968 | 165000. | 167300. | 167600. | 169000. | 174400. | 174100. | 175600. | 177100. | 178000. | 180000. | 179000. | 1729 0. | 2080000. |
| AVGE | 125563. | 127175. | 129513. | 128675. | 132750. | 135725. | 136863. | 138700. | 138313. | 137375. | 137425. | 13[illegible]5. | |

TABLE TOTAL- 12826800. MEAN- 133613. STD. DEVIATION- 28128.

All data to be read 3 decimal places left of indicated decimal.

JULY 1970 EMPLOYMENT INDEXES PERSONAL SERVICES - CANADA DBS CAT. NO. 72-002 P. 1, SERIES CPSF1

B 1. ORIGINAL SERIES

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 93900. | 93800. | 95100. | 97100. | 100400. | 105700. | 106800. | 106800. | 103100. | 100400. | 98800. | 975 0. | 1199500. |
| 1962 | 95200. | 94900. | 95800. | 97800. | 102700. | 106600. | 107900. | 107700. | 104300. | 101200. | 99600. | 991 0. | 1211100. |
| 1963 | 97200. | 97700. | 98900. | 100700. | 104800. | 109700. | 111200. | 111900. | 109700. | 107100. | 105500. | 1043 0. | 1258600. |
| 1964 | 103300. | 104400. | 105500. | 105900. | 111300. | 116900. | 119800. | 120100. | 117900. | 114900. | 113500. | 1114 0. | 1344600. |
| 1965 | 110600. | 111200. | 112700. | 115200. | 119600. | 125500. | 127500. | 127900. | 125700. | 122500. | 121900. | 1202 0. | 1445500. |
| 1966 | 120300. | 122900. | 123000. | 125600. | 129600. | 135400. | 137000. | 138900. | 137000. | 133900. | 132000. | 1277 0. | 1564500. |
| 1967 | 130300. | 131800. | 133400. | 134500. | 142400. | 148200. | 153200. | 150500. | 148600. | 145900. | 141900. | 1349 0. | 1598600. |
| 1968 | 137300. | 137300. | 137700. | 140500. | 145200. | 149500. | 152100. | 153200. | 153300. | 153400. | 147900. | 1442 0. | 1749600. |
| AVGE | 111013. | 111638. | 112775. | 115035. | 119413. | 124688. | 125438. | 127125. | 124975. | 122038. | 120138. | 1179 3. | |

TABLE TOTAL- 11466500. MEAN- 119443. STD. DEVIATION- 17641.

All data to be read 3 decimal places left of indicated decimal.

# TABLE XLII

B 1. ORIGINAL SERIES JULY 1970 HOTEL,RESTAURANT EMPLOYEES - CANADA (20+ EMPL.)DBS CAT. NO. 72-002 P. 1, SERIES CHSF1

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 66203. | 66343. | 66851. | 69342. | 72903. | 77866. | 79575. | 80241. | 77961. | 74576. | 7398[illegible]. | 730[illegible]1. | 878[illegible]0. |
| 1962 | 72335. | 72501. | 73224. | 74742. | 78459. | 82268. | 84430. | 84153. | 76067. | 76397. | 75547. | 744[illegible]5. | 9246[illegible]6. |
| 1963 | 74123. | 74656. | 75144. | 76724. | 80506. | 85364. | 87202. | 88372. | 86508. | 84213. | 82739. | 821[illegible]1. | 9776[illegible]7. |
| 1964 | 81562. | 82375. | 83224. | 84603. | 88369. | 92959. | 96192. | 97556. | 95216. | 92065. | 9[illegible]9[illegible]0. | 892[illegible]8. | 1074219. |
| 1965 | 89119. | 89543. | 90854. | 92520. | 98057. | 102554. | 105781. | 106460. | 104355. | 101758. | 10[illegible]319. | 9[illegible]7[illegible]5. | 1180645. |
| 1966 | 97852. | 99402. | 100744. | 103099. | 107917. | 112395. | 114287. | 117152. | 116518. | 112035. | 11[illegible]5[illegible]5. | 109052. | 1309[illegible]. |
| 1967 | 108362. | 110808. | 112575. | 115316. | 120390. | 126213. | 128045. | 129227. | 127071. | 123992. | 12[illegible]432. | [illegible]178[illegible]6. | 1445[illegible]. |
| 1968 | 116654. | 116818. | 118135. | 119408. | 122712. | 127725. | 131222. | 133072. | 132341. | 130895. | 127066. | 12[illegible]7[illegible]1. | 1500[illegible]9. |
| AVGE | 88276. | 89056. | 90[illegible]. | 91969. | 96289. | 100913. | 103331. | 104523. | 102004. | 99485. | 97672. | 9[illegible]0[illegible]6. | |

TABLE TOTAL- 9277346. MEAN- 96639. STD. DEVIATION- 19243.

All data to be read 3 decimal places left of indicated decimal.

I 1. ORIGINAL SERIES JULY 1970 EMPLOYMENT INDEXES RECREATIONAL SERVICES - CAN.DBS CAT. NO. 72-002 P. 1, SERIES CHS-1

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | 89900. | 91800. | 94[illegible]. | 969[illegible]. | 1065[illegible]. | 1113[illegible]. | 1[illegible]1300. | 1[illegible]3[illegible]. | 102[illegible]. | 96600. | 95200. | 9[illegible]3[illegible]. | [illegible]1925[illegible]. |
| 1962 | 90300. | 90900. | 91[illegible]. | 948[illegible]. | 103400. | 115600. | 115900. | 116800. | 109000. | 100800. | 90200. | 9[illegible]5[illegible]. | 1211[illegible]. |
| 1963 | 90400. | 92500. | 93[illegible]. | 100[illegible]. | 108600. | 118300. | 121200. | 120700. | 112300. | 106200. | 98800. | [illegible]3[illegible]. | 12528[illegible]. |
| 1964 | 92800. | 94500. | 983[illegible]. | 10[illegible]. | 112100. | 120800. | 125000. | 127400. | 118000. | 112800. | 108600. | 9[illegible]9[illegible]. | [illegible]315[illegible]. |
| 1965 | 97300. | 101100. | 1029[illegible]. | 111[illegible]. | 121000. | 130900. | 134700. | 137000. | 122200. | 117000. | 116300. | [illegible]113[illegible]. | 1407[illegible]. |
| 1966 | 109900. | 111600. | 115[illegible]. | 1239[illegible]. | 1301[illegible]. | 1357[illegible]. | 145100. | 144900. | 134300. | 132500. | 129000. | [illegible]1[illegible]2[illegible]. | [illegible]5315[illegible]. |
| 1967 | 120000. | 123800. | 124[illegible]. | 1294[illegible]. | 1392[illegible]. | 1483[illegible]. | 153600. | 148300. | 141300. | 140900. | 129400. | 12[illegible]5[illegible]. | 16247[illegible]. |
| 1968 | 130200. | 131200. | 12750[illegible]. | 139[illegible]. | 149300. | 1552[illegible]. | 163800. | 15[illegible]. | 152200. | 149100. | 142300. | 13[illegible]. | 173[illegible]0. |
| AVGE | 102600. | 104425. | 1061[illegible]. | 112513. | 121275. | 129635. | 134200. | 133175. | 123900. | 119488. | 113725. | [illegible]5[illegible]3. | |

TABLE TOTAL- 11268[illegible]. MEAN- 117390. STD. DEVIATION- 19148.

All data to be read 3 decimal places left of indicated decimal.

# CHAPTER FIVE

# THE ALBERTA SERVICES IN SUMMATION

It becomes apparent from studying the seasonally adjusted figures that growth in the individual Alberta services has occurred as well as rapid growth in the aggregated services. This increase in the growth of the services is not a sudden or temporary phenomenon, but would appear to be part of a long run trend from observing the behavior of the secular factors. The overall demand for services can be said to depend on the:

(a) change in relative prices of services, tastes and technology.

(b) distribution of income, as well as its average level.

(c) adjustment of consumption expenditures, which may be geared to income values of a previous time period.

(d) change, if any, in the elasticity of demand for a particular service.

As the goods sectors of the economy become more capital intensive and automated, increases in labor force demand must be directed toward the service industries. Services are frequently not as capital intensive as goods industries. However, it must be admitted that some of the newer business services such as data processing centers and computer sharing facilities do have heavy capital requirements.

## MALE-FEMALE PARTICIPATION

Service industries do not make demands on strength, therefore a great many women can be employed. Many services

make great use of female and part-time female employees. Thus, at this point, it would do well to consider the composition of the services industries with respect to male-female participation, and its change over time, if any. Again, there are problems of data continuity involved. The only data obtainable with the provincial labor force broken down according to sex groupings is the decennial census published in DBS catalogue number 94-501. Therefore, the latest information available is that of 1961. Below is Table XLIII indicating the percentages and actual employment in the services for Alberta from 1931 to 1961.

TABLE XLIII

Male-Female Participation

| | | Male | | Female | |
|---|---|---|---|---|---|
| 1931 | Total Alberta Labor Force | 252,315 | 100% | 33,425 | 100% |
| | Services | 8,882 | 3.52 | 13,042 | 39.02 |
| | Personal Services | 6,952 | 2.76 | 13,013 | 38.93 |
| 1941 | Total Alberta Labor Force | 247,456 | 100 | 40,375 | 100 |
| | Services | 8,487 | 3.43 | 17,305 | 42.86 |
| | Personal Services | 6,260 | 2.53 | 17,253 | 42.73 |
| 1951 | Total Alberta Labor Force | 290,931 | 100 | 62,566 | 100 |
| | Services | 18,226 | 6.26 | 17,047 | 27.25 |
| | Personal Services | 8,019 | 2.76 | 16,866 | 26.96 |
| 1961 | Total Alberta Labor Force | 361,961 | 100 | 127,550 | 100 |
| | Services | 29,203 | 8.07 | 30,647 | 24.03 |
| | Personal Services | 13,558 | 3.75 | 29,993 | 23.51 |

It is readily discernible from the foregoing that the proportion of males employed in the Alberta services just doubled from 1931 to 1961, going from 3.52% of the labor force to 8.07% - not very spectacular. Female participation went

down accordingly from 39.02% to 24.03% in the same time period.

The picture for Canada as a whole is not very much different from that presented by Alberta over the years 1931 to 1961 (Table XLIV).

TABLE XLIV

Male-Female Participation

| | | Male | | Female | |
|---|---|---|---|---|---|
| 1931 | Total Labor Force-Canada | 3,244,788 | 100% | 663,329 | 100% |
| | Services | 137,325 | 4.23 | 225,067 | 33.93 |
| | Personal Services | 98,222 | 3.03 | 224,316 | 33.82 |
| 1941 | Total Labor Force-Canada | 3,352,428 | 100 | 831,129 | 100 |
| | Services | 153,486 | 4.58 | 284,896 | 34.28 |
| | Personal Services | 105,874 | 3.16 | 284,029 | 34.17 |
| 1951 | Total Labor Force-Canada | 4,114,407 | 100 | 1,162,232 | 100 |
| | Services | 269,446 | 6.55 | 246,914 | 21.24 |
| | Personal Services | 136,790 | 3.32 | 244,550 | 21.04 |
| 1961 | Total Labor Force-Canada | 4,694,294 | 100 | 1,763,862 | 100 |
| | Services | 401,097 | 8.54 | 398,703 | 22.60 |
| | Personal Services | 197,972 | 4.22 | 390,447 | 22.14 |

Male participation rates in the services went from 4.23% of the labor force in 1931, to 8.54% in 1961. Female participation decreased from a figure of 33.93% in 1931, to 22.60% in 1961.

The question now arises, has the male-female ratio changed at all in the decade of the 1960's, considering the rapidly growing cyclical factor observed for all of the services? The answer from the following Table XLV is a qualified yes.

TABLE XLV

Male-Female Participation - December 1969

| | Male | Female |
|---|---|---|
| Total Services - Canada | 59.5% | 40.5% |
| Business Services | 66.6% | 33.4% |
| Personal Services | 48.3% | 51.7% |
| Recreational Services | 71.1% | 28.9% |

The above table indicates the percentages employed in the various services industries for Canada as of December, 1969. The qualification to the above answer arises from the fact that this information is obtained from DBS catalogue number 72-002, which is a large firm survey only. While this information is not published for the Province of Alberta, it is probably safe to say that the proportion of males and females employed in the various Alberta services has gone much the way it has for Canada, considering the compatibility of ratios in the census data. It is noted in the above chart that the male employees now dominate all aspects of the indicated services, with the sole exception of the personal services.

## GROWTH RATES

Perhaps the large growth rates experienced by the Alberta services so nebulously referred to in earlier chapters should be put forth in more concrete terms. Below is displayed Table XLVI indicating the growth the Alberta services have experienced over the time span of 1961 to 1968 in terms of the seasonally adjusted data.

TABLE XLVI

Rate of Growth

| Series | Rate of Growth 1961-1968 |
|---|---|
| Total Alberta Labor Force | 52% |
| Total Services | 84% |
| Business Services | 92% |
| Personal Services | 74% |
| Hotels, Restaurants | 106% |

This then directly confirms one of the postulates advanced in the introductory chapter that the services are indeed experiencing rapid growth rates, in fact as much as twice that of the total provincial labor force.

## DATA COMPATIBILITY

In order to overcome the data compatibility problem somewhat and to mollify those unhappy with a data mix of raw figures and index numbers, raw figures are published in Table XLVII below for the various services. These are taken from DBS catalogue number 72-002 (with the appropriate cautions), and are figures for the month of December of each year.

TABLE XLVII

Employment Data

| | 1966 | 1967 | 1968 | 1969 |
|---|---|---|---|---|
| Total Services-Alberta | 23,101 | 25,404 | 27,485 | 34,618 |
| Business Services | 5,612 | 6,029 | 6,297 | 8,183 |
| Personal Services | 13,022 | 13,650 | 14,523 | 16,981 |
| Hotels, Restaurants | 10,520 | 11,265 | 12,039 | 14,507 |

In Alberta, the largest individual service industry examined in this project is obviously the personal services

group. It can now be seen how large the hotels, restaurant and taverns group really is, having hitherto been considered a subgroup of the personal services.

The identical data (Table XLVIII) for Canada is displayed below with the addition of the recreation services.

TABLE XLVIII

Employment Data

| | 1966 | 1967 | 1968 | 1969 |
|---|---|---|---|---|
| Total Services-Canada | 270,597 | 290,125 | 305,504 | 354,444 |
| Business Services | 65,585 | 67,336 | 72,451 | 83,082 |
| Personal Services | 138,082 | 146,121 | 151,940 | 168,509 |
| Hotels, Restaurants | 109,052 | 117,836 | 123,761 | 140,678 |
| Recreation Services | 20,374 | 22,352 | 23,586 | 33,839 |

The size and percentages employed by the various services as a part of the total services correspond roughly for Alberta when compared to Canada. Therefore, prevailing on the economist's omission of sins by invoking ceteris paribus conditions, it would not be too unrealistic to expect the employment in Alberta's recreational services to be roughly around 3,400 employees when tabulated by the Dominion Bureau of Statistics, as of December, 1969.

## IN SUMMATION

The service industries are not as sensitive to business cycles as are other industries. There are no swings of inventory experienced by the services. Those employees on salary are generally not dismissed during an economic recession in the more technical services because of their high level of education, and the cost that would be involved

in rehiring or training new employees. There are also people in the personal services especially who are not paid a salary, but who function on a commission basis.

The worker is not alienated from his work in the services, as they offer a highly personalized service. For example, health, business, entertainment, and most of all, personal services offer their services directly to the consumer. Thus, the lament of the new generation becomes invalid.

There can be very little doubt as to the wisdom of orienting government socioeconomic policy to promote employment in the services. All of the services examined for Alberta exhibited strong positive cyclical factors, showing that there is indeed justification for the belief that this growth is undoubtedly part of a long run trend.

The seasonal analysis of the total Alberta services reveals one of the most stable industries examined in this project, second only to the total Canadian services. That the seasonal adjustment factors for the total Alberta services appear to be diverging in more recent years is a bit of an anomaly, considering the converging pattern of its component services. However, fears in this direction may be dispelled over time. Certainly the regular predictable pattern exhibited by the individual services would appear to confirm this. With the converging pattern of seasonal adjustment factors for these services, it will likely only be a matter of time before the standard deviation of their average values will also decrease.

That the services are incorporating an increasingly large part of the total Alberta labor force is without question.

# FOOTNOTES

1. Robert A. Gordon, Business Fluctuations, New York: Harper and Brothers, 1952, Ch. 8.

2. Ibid, pp. 180-5.

3. Ibid, p. 213-4.

4. Juluis Shiskin and Harry Eisenpress, Seasonal Adjustments by Electronic Computer Methods, Technical Paper 12, National Bureau of Economic Research, 1958.

5. M. D. Thomas, "The Export Base and Development Stages: Theories of Regional Economic Growth", Land Economics, 40, 1964, pp. 421-432.

6. Douglas North, "Location Theory and Regional Economic Growth", Journal of Political Economy, 63, 1955, pp. 243-58.

7. Ibid, p. 247.

8. Douglas North, "Agriculture in Regional Economic Growth", Journal of Farm Economics, 41, 1959, pp. 943-51.

9. Gordon, op. cit., p. 186.

10. Shiskin and Eisenpress, op. cit., p. 416.